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A Difficult Year

THE year just ending has probably been one of the most difficult and frustrating for all sections of British railwaymen. Very little encouragement has been received either from Government or public in support of the efforts which have been made by all stages of railway management to press on with the improvement of facilities and services and to bring a stage nearer fruition of the modernisation plan, with which they have been struggling so strenuously for so long. Far too much time has had to be devoted to extraneous matters. Calls on the time of railway officers by such bodies as the Select Committee and the Stedeford Group, to name but two, have placed a burden on officers who were already fully engaged on more productive matters. The peculiarly unsympathetic and often critical attitude of the Ministry of Transport has added greatly to the feeling of frustration which has afflicted all ranks. Notwithstanding these and other disabilities, railway officers as a whole have shown the resilience which is one of their most important characteristics and have got on with the job of producing transport in an atmosphere which has not been calculated to inspire enthusiasm. A good deal of very real progress has been made with the various electrification schemes in the regions, and if these, too, have been dogged by ill-luck in some respects, at least the basis has been firmly laid for progress in the future. It is inevitable that, with the public eye trained so avidly on railways, mishaps and shortcomings have been magnified which might have passed unnoticed or attracted far less attention in other industries and, because of the political importance which attaches to the transport system at the present time, a good deal of capital has been made of events which in themselves have been of domestic importance only. The threat of further Governmental interference in the structure and organisation of the railways, which has overhung the industry throughout the year, has not been wholly clarified even now. It says much for the excellent discipline and morale of railway officers as a whole, that despite all these unfavourable factors, they have been able to preserve so strong a loyalty to the basic principles of the railway system in this country and have continued to press ahead, so far as they have been permitted, with its development.

Rough Riding on British Railways

THREE railway officers, who each in his separate way is intimately concerned with the current problem of unsatisfactory riding of some of British Railways rolling stock, took part in a discussion on the Channel Three of the British Broadcasting Corporation's services on December 18. Mr. R. C. Bond, Technical Adviser to the Commission, Mr. J. F. Harrison, Chief Mechanical Engineer of the British Railways Central Staff, and Mr. R. A. Smeddle, Chief Mechanical & Electrical Engineer of the Western Region of British Railways, jointly expressed their views on some of the troubles that have been experienced in recent months in securing good riding of a number of trains. Mr. Bond, quite early in the talk, put the matter into perspective; he said that on British Railways there were some 40,000 coaches of all kinds; many of these rode very well indeed, but he admitted that there were some that left a great deal to be desired. Both he and Mr. Harrison pointed out that the British Railways standard bogie gave a good ride when fresh out of the shops or when it was newly out of service and repair.

Development at Swindon

THIS point was emphasised by Mr. Smeddle, who explained that after some time in use the British standard bogie deteriorated. A good deal of work had been done on the bogie at Swindon, and as a result it had been re-designed. Some of these newly-developed bogies were now in use and under test, and they gave promise of overcoming the disabilities which had been brought into prominence. Some 50 sets were on order, and although it was early to pronounce judgment on them, there was every indication that a good deal of the trouble had been solved. There can be no doubt that the British Railways standard bogie, to which a good deal of attention has been drawn in recent months, has given excellent performance; indeed, it was outstanding in its running during competitive trials on the Continent. Mr. Bond summed up the bogie position by saying that within the next few months as a result of the development now taking place and modifications in design which were already advanced, there would be a very marked improvement in the riding of passenger vehicles on British Railways.

Other Bogie Troubles

IT was also clear from the discussion that the difficulties being experienced with bogies on British Railways at the present time were not confined to the British Railways standard type. The Schlieren bogie had also given a good deal of trouble, but this again was not considered to be an insurmountable problem but merely needing time to secure the right answer. The Commonwealth bogie, which is basically different in its suspension from the standard bogie, in due time is expected to be succeeded by the new British Railways standard bogie now being evolved at Swindon. In connection with the riding

of the high-speed Pullman trains, which have attracted a good deal of criticism, it must not be overlooked that the couplings used and the rather rigid and heavy vestibules between coaches may have had some effect on the riding of the trains. Mr. Harrison struck a very practical note in the discussion when he said in effect that the evolution of a successful bogie was not only a matter of application of engineering principles but of practical tests on the permanent way. It would appear to be equally true that success in bogie design is not confined to the initial few thousand miles of its running but to longer term experience.

Sir Brian Robertson's Message

SIR BRIAN ROBERTSON, Chairman of the British Transport Commission, has issued the following Christmas and New Year message to all members of the staff throughout the Commission's undertakings: "Christmas is a family occasion. Because our organisation is so large, it would seem to others to be impersonal. In fact, I believe that there is a genuine family feeling throughout it. I certainly am sincere in wishing, on behalf of my colleagues and myself, to every one of you—a happy Christmas to you and your family. For many of you it will be a working Christmas. It is of the nature of our business that this should be so. It is our job to give service where service is required. Nineteen hundred and sixty has been an eventful year for us in many ways. On balance it has been an encouraging year. I hope that 1961 may be a better year still for you and for the great industry in which we serve." Sir Brian Robertson's message will be appreciated, particularly by British Railways officers who share his unspoken belief in the future of the railways.

Electrification Must Go On

THE news that British Railways has withdrawn all electric services from the new Glasgow suburban electrification because of technical faults follows closely on two mishaps, the earlier involving injury to eight people. Although remarkable restraint has been shown by Press and public, there is inevitably some linking of the Glasgow débâcle with trouble experienced on the newly electrified lines of the Eastern and London Midland Regions. Different manufacturers are involved: Associated Electrical Industries with the Scottish and London Midland stock; the General Electric Co. Ltd. and the English Electric Co. Ltd. with that of the Eastern Region. The whole situation is being closely studied by the manufacturers and the Commission, and the view has been expressed that the trouble lies in operating an entirely new system under unknown conditions. In stating this, the manufacturer concerned—G.E.C.—has added: "The railways are not to blame: it is the kind of thing you get when new designs are tried out in service for the first time." The troubles must and will be overcome: the alternative is that British Railways and the British electrical equipment industry will remain under a cloud for many years to come.

Overseas Railway Traffics

OPERATING Revenues of the Canadian National Railways for the month of October, 1960, amounted to $56,263,000. Expenses, taxes and rents totalled $59,098,000 resulting in a net operating deficiency for the month of $2,835,000. In October, 1959, operating revenues were $62,632,000; expenses, taxes and rents were $62,336,000 and the net operating income was $296,000. The aggregate net operating deficiency for the period January 1 to October 31 was $21,865,000 ($1,327,000). The approximate gross earnings of the Indian railways for October, 1960, showed an increase of 10.7 per cent as compared with the approximates for October, 1959. During the month the number of wagons loaded with goods traffic increased by 12·8 per cent on the broad gauge and by 5·42 per cent on the metre gauge as compared with October, 1959.

Locomotive Engineers Relax

THE dinner and dance of the Institution of Locomotive Engineers, although of comparative recent introduction, has now become an established feature of the Institution's year. The function, which was held last Thursday week, was exceptionally well attended. Over 400 members and their guests had an extremely enjoyable evening under the presidency of Mr. Derek C. Brown, C.B.E., who, in his brief but very suitably light-hearted address made it clear that in the Golden Jubilee year of the Institution there were other functions equally pleasing to the members and their ladies to which they could look forward. The Institution is particularly fortunate in its membership, both on the technical and social side, and events such as the annual dinner and the Summer tours do much to consolidate the good-fellowship which is a marked feature of that body. Mr. Maurice A. Crane, who has the responsibility of organising social functions, well merits the congratulations which he always receives on these occasions, and the Secretary, Mr. G. T. Hart and the Assistant Secretary, Miss J. M. Johnson, are well known to be the strength in the organisation which does so much to make for the successful running of these events.

The Institute of Transport in 1959-60

THE congress in London on April 26-29 was a notable feature of the Institute of Transport year ended September 30, 1960. It included the exhibition of British Railways motive power, rolling stock, and containers at Marylebone Goods Depot, and visits to British Railways and London Transport Underground installations. The Institute report shows that during the year growing activity overseas resulted in formation of a Nyasaland Group and a Bulawayo Graduate & Student Society. The President, Mr. R. G. Grout, Chairman of the General Steam Navigation Co. Ltd., visited many branches in Britain. The first public lecture in London by the Institute of Transport Reader in the Economics & Organisation of Transport in the University of Oxford, Mr. D. L. Munby, was read to the Royal Society of Arts in May; entitled "Future Developments of the Internal System of Transport," it was the subject of editorial comment in our issue of May 13. Membership at the end of the year totalled 10,335, an increase of 293 over 1958-59, and 844 students were elected. The presidency for the current year was assumed on October 1 by Mr. K. W. C. Grand, Member of the B.T.C. and formerly General Manager of British Railways, Western Region.

Freight Traffic Increase

BRITISH Railways freight traffic figures for the first 47 weeks of 1960, announced at a meeting of the Winter Transport Central Joint Conference under the chairmanship of Mr. K. W. C. Grand, member of the British Transport Commission, compare favourably with those for the same period of 1959. The total increase of 14,500,000 tons consisted of 2,400,000 tons of general merchandise, 7,700,000 tons of minerals, and 4,400,000 tons of coal and coke. Carrying capacity has been improved by closer co-operation between British Railways and its customers, in particular the National Coal Board, and by extensive traffic re-routing. These arrangements have reduced the possibility of the delays which might have been caused by congestion in the areas most affected by staff deficiences. Furthermore, revised arrangements will be introduced in January to increase the proportion of through working and to reduce the number of wagons dealt with at exchange junctions which are liable to be affected by current difficulties. Unless working is disrupted by unforeseen events, the provisions made should be more than adequate to deal with traffic this winter.

Private Ownership of Steel Firms

PROGRESS in return to private ownership of steel firms is shown in the seventh annual report, for the year ended September 30, 1960, of the Iron & Steel Holding & Realisation Agency. Four more completely subsidiary companies were de-nationalised, bringing the total for the past seven years to 54; seven, including Richard Thomas & Baldwins Limited, remained for disposal. Since 1953 the Agency's total of investments and obligations had been reduced by £165 million to £199 million. In the year under review proceeds from realisation of securities in steel companies were over £10 million. Cumulative gross realisation proceeds to September 30 last amounted to nearly £250 million. In terms of production, sales of products, and numbers of employees, the concerns which have ceased to be subsidiaries are stated to account for

six-sevenths of the total to be returned from State ownership. Despite the disturbances of nationalisation and subsequent reversal of that policy, the British iron and steel industry has long continued to be one of the most efficient in the world.

Railway Re-organisation

PHRASED to mean all things to all men, the long-awaited White Paper on the reorganisation of the nationalised transport undertakings—summarised elsewhere in this issue—gives no readily apparent cause for worry to railwaymen. It proposes that the Government shall relieve the railway debt of £400 million and place a further £800 million in suspense, thus absolving the railways of some £40 million interest a year. It also proposes to replace the British Transport Commission and the existing railway organisation by a new structure designed to overcome what the Government considers to be the main defects and disadvantages of the present organisation, and to give the Commission's various undertakings maximum freedom of operation in commercial affairs. The Commission is to be superseded by a British Railways Board comprising a Chairman and a Vice-Chairman, a representative from each of the Regional Railway Boards (which will replace the existing Area Boards), certain full-time members with special responsibilities, and one or two part-time members. Each Region is to be self-accounting.

On the premise that a further major overhaul of the transport organisation is necessary, and that the need is so great as to justify the kind of disturbance that is inevitable in an operation of this magnitude, the foregoing proposals superficially may commend themselves. On the other hand, there are many points in the plan which merit very close scrutiny. Although the White Paper states that the Commission and the railways are to become more compact and therefore more efficient, it does not show how this is to come about. Further inquiry has elicited the information that this will be worked out between the Minister and the as-yet-unformed British Railways Board. This, incidentally, will be preceded—before legislation permits its existence—by a shadow board (which will first take the form of "a sub-committee") comprising the membership which will be appointed when the actual body is legally recognised. This shadow board will discuss and put into effect as many modifications to Commission and railways as are permitted under the present Transport Act. As neither the exact constitution of the shadow board nor the extent and nature of the modifications can be ascertained between now and next November, when they will be revealed to an expectant Parliament for discussion and assent, it appears there is to be yet another "interim" period during which all grades of railwaymen will feel uncertainty as to personal and group future.

The White Paper also contains worrying and puzzling sentences such as the following: "The London Transport Executive will be called the London Transport Board and will continue to be composed mainly of full-time members of whom a number will have special responsibilities" (para. 20). What special responsibilities? "Co-ordination of policy between the new boards, including allocations of funds for new investment, will be the responsibility of the Minister of Transport. In this he will be assisted by a new advisory body, the Nationalised Transport Advisory Council." Another committee. This one will have no executive functions—its main responsibility will be "to advise the Minister on questions relating to the co-ordination of the nationalised transport undertakings and on questions of policy." Comprising the Chairmen of the boards of British Railways, London Transport, British Transport Docks, the Inland Waterways Authority, and the holding company, it also will include "other members . . . drawn from outside the nationalised transport undertakings." And, "the Minister will ordinarily act as Chairman of the Council" (paras. 27, 29 and 30). "There should be much greater opportunities in future for those in all parts of the railway service to make their way to the top. At the outset, however, some major posts may have to be filled from outside" (para. 33). Why? Discreetly at the end of the White Paper, in para. 52, is the statement: "The profits of the holding company will accrue to the Exchequer in the form of dividends and should be some offset to losses on other nationalised transport undertakings." Much earlier on, in para. 24, we learn that British Transport hotels will come under "a new holding company responsible to the Minister, who will appoint its board." Naboth had no luck with his vineyard either.

Two welcome points, although not new in themselves, make good reading when asserted by the Government. These are that "a railway system of the right size is an essential element in our transport network and will remain so for as long as can be foreseen" (para. 5), and that "the present restrictions on the ability of the railways to adjust quickly and adequately their freight charges and passenger fares are, in the Government's view, no longer justified in present competitive conditions. The railways will therefore be freed from statutory control over their charges, except for fares in the London Passenger Transport Area where the London Transport Executive and British Railways have a virtual monopoly of public passenger transport. This change will substantially reduce the functions of the Transport Tribunal" (paras. 5, 56, and 57). Another good thing is that freehold and leasehold property now held by the Commission will be developed, transferred, or disposed of—here comes the snag—under "one or more organisations" (more committees?) "specially equipped to advise" (para 26). This is a long-awaited step forward, even though the way it will be allowed closes the outlet for a talent which nationalised British transport has never been permitted to display.

It is impossible to judge whether this White Paper covers a workable scheme to put British transport back on its feet, for it literally is only an outline of a plan the details of which apparently are not yet envisaged, even by the Minister himself. The public will not be told, either piecemeal or in entirety, of the various measures which will turn the outline into an integrated whole, though presumably these eventually will be announced, for Parliament must debate them before legislation to fulfil that proportion of them not covered by the present Act can be passed. Let us hope that the Minister will not be as coyly reticent next November as he is now regarding the Stedeford proposals, of which both Parliament and public are still ignorant. "Do first—and ask afterwards" is a dangerous and undemocratic habit to adopt.

British Transport Commission Traffic Receipts

COAL class traffic receipts of British Railways have continued to rise, mainly because of stocking of domestic coal for a hard winter. During the four-week period, No. 12, ended December 4, receipts from this source were £9,560,000, against £9,403,000 for the preceding four weeks, and £8,763,000 for Period 12 of 1959. Mineral traffics have fallen from £4,139,000, for the four weeks to November 6, to £3,901,000 for Period 12; the latter total is not much more than the corresponding figure in 1959. There is no obvious explanation for this, as considerable activity is reported to have continued in the iron and steel industry.

	Four weeks to		Incr. or decr.	Aggregate for 48 weeks to		Incr. or decr.
	Dec. 4, 1960 £000	Nov. 29, 1959 £000	£000	Dec. 4, 1960 £000	Nov. 29, 1959 £000	£000
Passengers—						
British Railways ...	9,604	8,884	+ 720	139,204	129,252	+ 9,952
London Transport—						
Road passenger services	4,382	4,285	+ 97	52,427	50,664	+ 1,763
Railways	2,150	2,004	+ 146	24,147	22,008	+ 2,139
Provincial & Scottish buses	4,432	4,206	+ 226	57,441	56,461	+ 980
Ships	190	195	− 5	6,913	7,189	− 276
Total passengers	20,758	19,574	+1,184	280,132	265,574	+14,558
Freight, Parcels & Mails						
British Railways—						
*Merchandise & livestock	8,670	8,784	− 114	94,919	92,749	+ 2,170
*Minerals	3,901	3,883	+ 18	45,324	40,915	+ 4,409
*Coal & coke ...	9,560	8,763	+ 797	100,447	100,185	+ 262
*Parcels, etc., by coaching train ...	4,633	4,391	+ 242	51,940	49,904	+ 2,036
*Total freight, British Railways	26,764	25,821	+ 943	292,630	283,753	+ 8,877
Others†	4,795	4,613	+ 182	53,593	51,355	+ 2,238
Total freight, parcels & mails	31,559	30,434	+1,125	346,223	335,108	+11,115
Total	52,317	50,008	+2,309	626,355	600,682	+25,673

*Includes receipts from collection and delivery, etc., and from railway freight traffic within Commission-owned dock areas
†Inland waterways freight, road haulage, and ships

Railway merchandise traffics also are disappointing. At £8,670,000 for Period 12 they are above receipts of £8,630,000 for Period 11, but below £8,784,000 for Period 12 of last year. The reasons for this decline may be complex. The rise in railway parcels traffic during November is encouraging, as is that in traffic receipts from the other carrying activities, mainly road haulage, of the British Transport Commission. More light on the fall in British Railways merchandise traffics may be thrown by the figures of tonnages conveyed, to be published in a few weeks.

British Railways and London Transport Underground passenger receipts were markedly up on last year, which seems to justify the selection of fares to be raised or reduced during the 12 months.

With 1960 nearly ended, the Commission's total traffic receipts for 48 weeks were 4·6 per cent more than a year previously, and British Railways receipts 4·7 per cent up. Improvement of this situation now depends much on judgment and skill in quoting goods rates, and on the quality of railway services.

PERCENTAGE VARIATION 1960 COMPARED WITH 1959

	Four weeks to December 4	48 weeks to December 4
British Railways :		
Passengers	+ 8·1	+ 7·6
Parcels	+ 5·5	+ 4·0
Merchandise & livestock	− 0.7	+ 2·3
Minerals	+ 0·4	+10·7
Coal & coke	+ 9·0	+ 0·2
Total	+ 4·7	+ 4·8
Ships (passengers)	− 2·5	− 3·8
British Road Services, Inland Waterways & Ships (cargo)	+ 3·9	+ 4·3
Road Passenger Transport, Provincial & Scottish	+ 5·3	+ 1·7
London Transport—		
Railways	+ 7·2	+ 9·7
Road services	+ 2·2	+ 3·4
Total	+ 3·5	+ 5·3
Aggregate	+ 4·6	+ 4·2

Machine-Tool Precision

ALTHOUGH precision manufacture and ease of control for obtaining accurate work have always been necessary basic characteristics of machine tools, there is today an increasing need for exceptionally high degrees of precision and speed in the production of engineering components. This trend will continue to follow the rising cost of skilled labour as long as consistent results are to be obtained at economic cost. The availability of ceramic and similar new cutting-tool materials which can work at temperatures higher than those possible with tungsten-carbide, and the introduction of new cutting oils and coolant systems, have enabled the loads applied to individual types and sizes of machine tools to be increased considerably. The result is that standards of rigidity and the degrees of machine-tool precision acceptable until recently, may no longer meet all present-day demands.

Dr. D. F. Galloway, Director of Research, the Production Engineering Research Association, in his paper " Machine tool research, design, and utilisation," delivered recently at a meeting in London of the Institution of Mechanical Engineers, has ably summarised much of the work which is being done both individually and collectively by machine tool manufacturers to remedy the situation. He has also stressed many points where greater attention is required and has put forward useful suggestions for increasing precision, not all of which involve additional heavy capital outlay.

The result of one investigation recorded by Dr. Galloway into the accuracy of calibrations for feed and speed for some machine tools has shown that not only are these data given unreliably sometimes in specifications, but they have been found, on occasions, to be incorrectly stated on engraved plates on the machines. Errors as great as 15 per cent have been found in practice and even more on machines with hydraulic drives. The accuracy of these calibrations is often taken for granted and scrapped work or failure to reach production targets is then the first indication that a preliminary machine inspection would have been desirable.

Flexing movements of the main elements of machine tools, allowed by a number of common weaknesses which lead to insufficient static and dynamic stiffness, often have to be dealt with in conjunction with other movements resulting from the accumulation of minute degrees of slackness in bearings and slides. The further addition of the flexure and movements of workpieces and tools and their holding devices give rise to results such as those which can be shown to occur even with high-grade drilling machines when the accuracy and alignment of the holes drilled in the workpiece are severely limited by the structural weaknesses of conventional twistdrills. Simple tests of the deflections of machine tools under loads of the kind imposed by the action of tools, workpieces, and gearing are not nearly as common as accuracy and alignment tests. Dr. Galloway believes that their wider use would benefit makers and users alike, and recommends the use of equipment and methods developed specially for the purpose.

Other observations include a call for wider understanding of vibration tests and techniques and practical implementation of experimental results. These might lead to significant improvements in machine-tool design and more effective inspection tests. If it is assumed that spindle speeds may have to be raised several times in the fairly near future, it is clear to Dr. Galloway that measures such as forced cooling by water circulation round the bearings will be needed to control bearings temperatures and preserve the thermal equilibrium of the machine. Of the materials available to reduce stick-slip friction on slideways, tests have shown that P.T.F.E. impregnated sintered bronze offers considerable advantages as long as it is used in conjunction with a fluid lubricant. Although this material can be used under dry conditions, the use of a fluid lubricant further reduces the coefficient of friction at both high and low sliding velocities. The high cost of ball or roller recirculating arrangements tends to restrict wider application of rolling-bearing slideways for long traverse movements. With regard to constant-mesh gear drives in which rapid speed-changes can be made by engaging clutches while the spindle is running, Dr. Galloway believes that there is scope for improvements to minimise the moments of inertia and to the design of clutches which will withstand the heavy-duty cycles imposed by short machining times.

Sir John Elliot Looks Back

RARELY has a really senior railway officer set down his own candid account of important features of railway policy with which he has been associated. A contribution by Sir John Elliot to the November issue of *The Journal of Transport History*, published by the Leicester University Press, is therefore of particular interest. His theme is " Early Days of the Southern Railway," which he has interpreted sufficiently widely to cover the evolution of that policy which guided much of the 25 years of active corporate life of the railway from the beginning of 1923 to the end of 1947. His own connection with the Southern began in 1925, when he joined the enterprise with the fresh outlook of a journalist, at a time that the Southern was in low popular estimation. His evaluation of the first three years of necessity is based on information rather than personal experience, although subsequently he was in a peculiarly favourable position to secure such information at first hand.

Sir John Elliot gives us a vivid cameo of three principal constituent railways, with their distinctive characteristics, different traditions, and unresolved rivalries. These needed to be assimilated, and the first stages were not helped by the refusal of the old boards of directors to support the appointment of a general manager other than their own. The resultant period with three joint general managers at separate headquarters was far from happy. Every decision had to be agreed by all three, and delay and frustration were inevitable. Sir Herbert Walker emerged as sole chief, and Sir John Elliot's story is largely an appreciation of his great work. He was an old North Western man, and we are told of an offer to return as General Manager of the L.M.S.R. which was declined. Sir John describes him as a monumental character, strong, clear-sighted, loyal to his employers and to his chief lieutenants. Under him the world's largest suburban railway electrification was developed, with a constant regard for economics. This is the more remarkable when we learn that the Southern Railway board would sanction nothing except unanimously. Its confidence in Sir Herbert Walker and his carefully-prepared schemes was such that only one electrification proposal was rejected—the Tonbridge–Hastings line—and we are told that the rejection " rankled with him for the rest of his life." With

the three exceptions of the Medway Valley, the Kent coalfield, and Southampton Docks, the Southern was mainly a passenger line, and roughly 75 per cent of its revenue came from this traffic. This was a vital factor in the consideration of its electrification.

Sir John presents intimate—almost indiscreet at times—glimpses of the personalities of directors and chief officers, but they are always relevant to his theme. The overall picture is described as that of an old-fashioned organisation functioning strongly and effectively in a new railway age. Everything that had to be done was done without over-elaboration or over-organisation. Policy was clearly laid down and as clearly understood. There are some illuminating passages on the titles, functions, and responsibilities of the chief officers, and a note on the change in designation of Sir John's own title from Assistant General Manager to Deputy General Manager. The A.G.M. was a chief officer in his own right, but not senior to the other chief officers; the D.G.M. carried executive authority. Sir John concludes: " When it started, the Southern Railway had everything to achieve. When its last day came, it had achieved much." With this summing-up few railwaymen can disagree.

Operational Research on British Railways

A DEVICE to record the identification numbers of wagons passing it, to aid in following transits or to trace and expedite particular wagons, is being studied by staff of the British Transport Commission and British Railways in conjunction with outside consultants. This is one of the many developments in operational research (O.R.) mentioned by Mr. M. G. Bennett, Superintendent (Operational Research), B.T.C., in the current issue of *British Transport Review*. His review shows the scope of O.R. methods, which railways in Britain began to use before nationalisation in 1948.

Design of passenger stations was one of the earliest studies in which O.R. was used. Its origin was the desire of the Civil Engineer of one of the main-line railways to see how far new methods of building construction could be used profitably. A committee of architects, commercial, operating and O.R. staff was set up with the aim of evolving not a standard type of station but principles to be followed in siting and designing a station, with exact information to enable the principles to be implemented in particular circumstances. Much of the work consisted of measuring what was happening at existing stations. The widths of approach roads and the way in which the throughput of a passage depends on its width, for passengers with and without baggage, are examples of useful basic design data obtained in this way. Planning of the location of station facilities was studied by methods very much like those now used in work study. Looking back on this work, he wonders how much of it would have been done had not a varied group of persons been segregated from routine duties to do it and whether better use could not be made of specialist research staff by executive staff with more time available to work with them.

An important part is played by O.R. in studies of goods traffic. Space allows only brief mention of the methods described. Three questions were to be answered: " How far would the work of the marshalling yards be assisted by more information coming to them about the traffic heading their way?"; " What method could be devised to locate particular wagons in which there may be a special interest ?"; and " How can the utilisation of wagons be improved ? " As to the first question, he outlines the difficulties of fluctuation in traffic and the cost of mental indigestion caused by an excess of data. An account follows of the way in which facts as to train running were obtained. Passing times at signalboxes were noted. The compositions of trains in marshalling yards were recorded to see whether additional information was required. Data on the loading of trains were analysed. The results of many of these analyses were published in interim reports. In some cases they have served purposes other than that for which they were designed, though they contain nothing that was not known qualitatively before. It is understood that the data on train loading have been used in other enquiries. To make full use of such data in the planning of developments the value of the flexibility given by spare train capacity must be assessed and compared with the cost of providing it, to arrive at a compromise. To use these and other data to calculate the best compromise would involve an attempt to quantify such intangible things as the commercial value of absorbing traffic subject to fluctuations and the less intangible economy of not absorbing it.

It was not feasible to examine in detail a proper sample of marshalling yards, but it was possible to do so thoroughly at one yard, and others were looked at cursorily. The advance traffic information found to be flowing was inadequate, and it was possible to set down the advance information which a yard ought to have to be able to plan its shunting satisfactorily, with the present degree of random fluctuation that occurs. As things are now, Mr. Bennett maintains, the information needs to be very full. This prompts the question whether it is not more desirable to reduce the fluctuations, instead of labouring to cope with them. The concentration of traffic at fewer depots and of marshalling yards will help, but it is not at all clear how far the process should be taken. This is a complex problem of the kind to which O.R. is applicable.

In location of particular wagons the information collected from the device mentioned above would be fed automatically into a computer, analysed, and sent to those who could use it. Such apparatus, it is suggested, if installed in sufficient numbers could also provide a wagon census. It could give the advance information required at marshalling yards, control offices and depots, and much of the basic information needed to plan new routings and timetables.

As to wagon usage, he describes continuous progress control (C.P.C.) a method being developed by the Western Region and an O.R. team in South Wales. This consists basically of a system of recording continuously the wagon position in the light of information on loaded and empty wagons supplied from stations, depots, and marshalling yards. This is more than controllers get now, but less than could be given by an automatic number-taking device, and it may be cheaper. When C.P.C. has been developed, collection of information, addition, and so on may be mechanised. The scope of mathematical processes and computers in increasing the efficiency of goods traffic movement is discussed by Mr. Bennett, with indications of many possibilities.

The applications of " simulation " techniques to wagon distribution and timetabling also are outlined. In simulation a simple mock-up in mathematical form is made, and a programme is worked out to represent the train of events which occurs in the system under examination. If complex it may have to be dealt with by a computer. Any change in that programme represents a change of method or condition, and its effect on the train of events can be observed. Thus information about a new signal, for instance, could be fed in and the effect observed.

To facilitate study by O.R. methods, an advisory panel has been appointed, consisting of senior officers of all Divisions of the Commission and Regions of British Railways. Most research by these methods is concerned with British Railways but the Superintendent (Operational Research) is responsible to the Traffic Adviser, B.T.C., so that the services of the O.R. Unit may be available to all the Commission's undertakings.

Tasmanian Transport Commission

THE report of the Tasmanian Transport Commission for the year ended June 30, 1959, a copy of which has been sent to us by Mr. C. E. Biard, the Commissioner, records almost a 40 per cent drop in the year's loss to £402,479, or £244,224 less than the loss of £646,703 sustained in 1957–58.

The following is a summary of operations:—

	1957–58	1958–59
	£	£
Net loss on railway services	1,020,001	889,086
Expenditure on administration and public vehicle control	53,532	55,895
Net receipts, road passenger services	7,678	2,478
Net receipts, road goods services	8,407	23,037
Loss for year	646,703	402,479

The operating results for the 3-ft. 6-in. gauge railways were:—

Revenue	2,569,233	2,706,594
Working expenses	2,980,614	2,971,494
Loss on working	411,381	264,900
Depreciation	237,020	243,640
Interest	371,600	380,546
Deficit	1,020,001	889,086

The increased revenue of £137,361 resulted from carriage of more goods and mineral traffic. Working expenses were very

slightly lower despite higher basic wages. Total train mileage was a little less at 1,539,343, compared with 1,567,888 a year earlier. The quantity of goods, minerals, and livestock carried was 41,980 tons more at 1,137,685 tons. Revenue from goods, minerals, and livestock rose to £2,426,466, against £2,290,320 in the previous year, with the principal gains being in cement, coal, and fertilisers.

Passenger revenue again decreased because of reduced train mileage, although the average density of traffic improved slightly. Despite considerable curtailment of passenger services in recent years, the resulting loss of revenue has been very much less than the saving in expenditure; while passenger train miles have been cut 41 per cent since 1950, revenue has fallen only 15 per cent.

During the year a further steady increase took place in the use made of diesel-electric locomotives, diesel-powered trains hauling 245,077,268 trailing ton miles, an increase of 22,471,809 on 1957–58, while steam trains hauled 44,206,341 trailing ton miles, a decrease of 5,973,912. The number of diesel-electric locomotives passing through the workshops increased slightly, but there was a reduction of £6,439 in their maintenance, as well as a decrease of £41,436 in steam locomotive maintenance costs. Two diesel-mechanical locomotives went into service, but 12 steam locomotives were written off, two from service and 10 previously stored. One diesel-mechanical "V" class shunting locomotive was constructed and one diesel-mechanical "U" class shunting locomotive was rebuilt during the year. Operating efficiency continued to increase, and a considerable amount of new traffic, including carriage of new motor cars, steel, machinery, and timber, was obtained.

Increases in margins which took effect from December, 1959, will have increased costs in 1959–60 by £75,000, and by £150,000 in 1960–61. There is still only very limited prospect of recovering increased costs by raising rail freight rates, and every avenue is being explored to obtain new business and gain additional revenue. Permissible train loads for diesel-electric locomotives have been increased over certain sections, enabling the handling of additional traffic without any increase in existing train services.

The commencement of the Bass Strait ferry service in October, 1959, with the Princess of Tasmania, which carries a limited amount of cargo in each direction between Melbourne and Devonport is anticipated to increase the tonnage and revenue of goods that will be carried by the Tasmanian Railways. An examination of train services is being carried out to determine whether it is practicable to improve train services between Southern Tasmania and the North West Coast, with the object of faster delivery.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Melbourne-Sydney Express Services

December 13

SIR,—In regard to the letter from Mr. L. Irvine-Brown (October 28 issue) on Melbourne-Sydney express services, his remarks are generally quite correct on the difficulties facing the two State railway systems, although the New South Wales Government Railways night expresses were not air-conditioned until recently and not up to inter-capital standards with its average 40 m.p.h. speeds.

The line from Albury to Mangalore is of heavy construction, single line with several heavy feeder branch lines connecting with it, therefore would not be simple to change over to 4 ft. 8½ in. as suggested by the writer, it would isolate the branch lines from the main line for through freight traffic. The capital outlay on the new line will not be killed economically, due to savings that will be made to goods and platform staff reduction of Albury. Only six train sets for express services will be in operation instead of nine, as at present.

In reply to Mr. Irvine-Brown's proposal that the line should have been electrified before electrification of the Melbourne-Yallourn-Traralgon lines, diesel-electric locomotives were used on the Gippsland main line. This allowed the Victorian Railway Commissioners an excellent opportunity to compare operating costs for diesel-electric with those for electric locomotive haulage (with local oil and electricity charges), and it has been found that any savings on the use of electric power are not sufficient to make any further electrification change-over attractive financially, even between Melbourne and the city of Geelong, 44 miles away. The railcars and diesel locomotive-hauled trains run at a similar cost to that if electrification had been introduced on this line.

The "inadequate h.p. (1,800 h.p.)" of the Clyde-General Motors diesel locomotives is quite sufficient to haul 1,000-ton trains at high speeds up and down the N.E. main line, and if any further tonnage up to the 75-vehicle limitation is to be handled, it can easily be done by coupling two or more locomotives together.

These Clyde-G.M. locomotives have been the means of a considerable increase in train tonnages and speeds in Victoria, and I understand that the Sydney express passenger trains on the new Melbourne-Albury 4-ft. 8½-in. line will be allowed to run up to 80 m.p.h. once the new line has settled down for normal working.

Mr. Irvine-Brown can well be assured that the Victorian Railways Commissioners have thoroughly gone into every aspect of modern railway working and practices when changes have been made to this State's railway system.

Yours faithfully,

E. H. BOWLES

11, Bank Street, Box Hill, Victoria

Defence Inadequate

December 17

SIR,—Your defence of British Railways in your last two issues would have been much more effective had it appeared over the signature of someone in authority within the organisation itself. As it is we are left with the impression that those on the Olympian heights are either unable or unwilling to defend themselves against attacks which merited an answer.

On the motive power side the views of Mr. H. F. Brown are the most refreshing we have had for a long time, and no number of red herrings dragged across the track is going to alter the fact that, if he is right about the U.S.A., he is equally right about Great Britain. Any electric locomotive, regardless of its source of power, can give a better performance than a comparable steam job at low speeds but, by the same token, when you are dealing with high average speeds with a need to accelerate from slacks rather than dead stops, the steamer can more than hold its own with anything bar a full electric.

Would you suggest that the never-ending chaos on the L.M.R., is doing any other than play into the hands of an anti-rail Government?

Why is it necessary to rebuild the entire system before it can be electrified? The French, Germans, Italians, all seem able to do the one without the other, and if the 25 kV. is the reason, are the long-term benefits of high voltage such as to justify a delay of years in bringing modernisation into being? Is there any logical reason why they should not have electrified the line as it stood, with motive power designed to suit the track, with fast schedules dependent on high power rather than on high top speed, the whole lot to be brought into action as rapidly as possible? With steam giving way section by section to electrification instead of the enormously costly farce of using diesels as an intermediate stage, having to rebuild the road to enable them to run and then finding them inadequate? It seems to me that far too much is being done for the supplier of equipment and far too little for the railway, or the railway user.

Yours faithfully,

L. IRVINE-BROWN

Ivydene, Tilston, Cheshire

THE SCRAP HEAP

Loud Voice

I travelled on a Sunday Excursion. On arriving at my destination I partly tore my ticket, handing it to the collector, so that he could return me the correct half. In a loud voice he said: " Another one with a broken arm."—*Letter to the "Evening Standard."*

Combined Operation

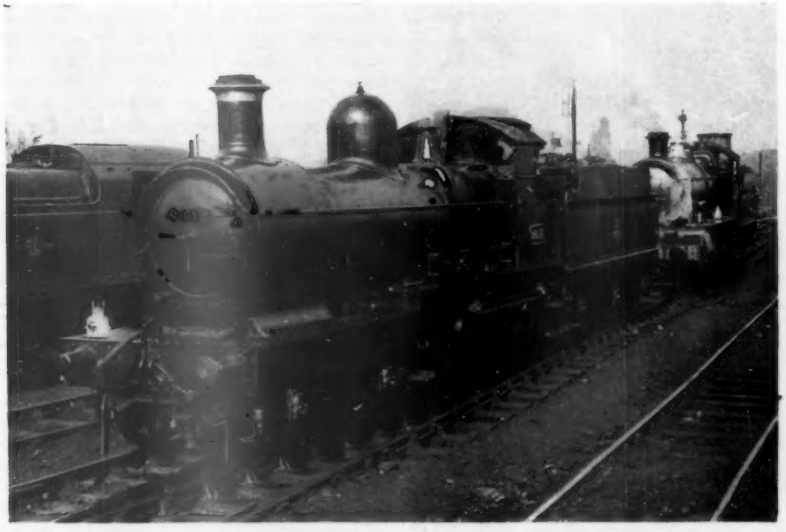
A claim to have travelled to all London Transport's 278 Underground stations in one " operational day " has been made by two brothers. They started at Upminster at 4.59 a.m. on Saturday and reached their final station, Aylesbury, at 1.26 a.m. on Sunday. They used 45 trains and seven buses and their journey was accomplished in a total of 20 hr. 27 min. Before their success, 20 other attempts by 46 people had been made since June, 1959, but none had succeeded in covering every Underground station.

Classless Travel in 1900

There is much to be said for one class only upon suburban trains, and, on account of our English habits and ways of thought, much to be said against it. The " twopenny tube " and the " omnibus," no doubt, present an object lesson, which might well be studied by our London railway men with a view to the introduction of certain modifications in their arrangements which would lead to economy in working and a more satisfactory service to the public.—*From " The Financial Times " of November* 24, 1900.

Preservation Fund

A fund for the preservation of British Railways, Western Region, 4-4-0 locomotive No. 9017, which is awaiting scrapping, has been opened by Mr. T. R. Gomm of Ford Street, Birmingham. No. 9017 is the last example of a double-framed locomotive in normal service on British Railways, and is typical of late nineteenth-century Great Western practice. If £1,500 can be raised by enthusiasts for the purchase of the locomotive, it will be used on the Bluebell Railway Preservation Society Line in Sussex.



Locomotive No. 9017 for which a preservation fund has been opened

What Indeed ?

" What is to be thought of a labour leader who gets up and declares that an hour's work per day is enough for a man, and that £1 per hour should be the price paid for it ? "—*From an editorial comment in " Transport," September* 1, 1893.

Cornered

A corner seat in the leading coach of the 8.59 a.m. British Railways, Southern Region, train from Purley has been occupied for 50 years by the same man, a Lloyd's Underwriter, who, at the age of 65, is now retiring. Fellow travellers on the 8.59 are planning to give him a dinner party, and it is believed that the Southern Region intends to honour its corner-seat patron in some way as yet unspecified.

Equine Modernisation ?

The writer of a letter to the *Evening News* says : "On arrival at Fenchurch Street Station we were greeted with apologies for trains being delayed, due to horses being on the lines near Pitsea. Do British Railways intend to keep horses nearby in case of the continued failure of engines ? "

Enlightened

According to several of our readers, the abbreviations " 8 Vic. cap.20.S.75 " which appeared on a photograph published in our December 16 issue, of an old railway notice of unknown origin, now in the museum of the Bluebell Railway Preservation Society, refer to Section 75 of the Railway Clauses Consolidation Act of 1845, which reads: " If any person omit to shut and fasten any Gate up at either Side of the Railway, for the Accommodation of the Owners or Occupiers of the adjoining Lands, as soon as he, and the Carriage, Cattle or other Animals, under his Care, have passed through the same, he shall forfeit for every such Offence any sum not exceeding Forty Shillings." The origin of the notice still remains a mystery.

John Fowler locomotive displayed by Melbourne Puffing Billy Preservation Society

" English Coffee is . . . "

Recently an Italian politician visiting the United Kingdom insisted, against his host's advice, in taking coffee after a British Railways restaurant-car meal. After one sip he blanched and put down his cup. " This," he gasped, " is a new drink to me, but it is not coffee." The waiter re-appeared and whipped away the unfinished cup. When he returned a moment later with another, an explanation was demanded. " Well, sir," was the reply, " there's been a slight mistake. There were two pots waiting in the kitchen, and I poured from the wrong one. It contained gravy juice."—*Condensed from " The Financial Times," of December* 21, 1960.

Puffing Billy Fair

The 2-ft. gauge locomotive shown on this page was built in 1893 by John Fowler & Company. It spent many years in the canefields of Queensland, Australia, where it was used for haulage work. In 1924, it was bought by Miller & Co. (Machinery) Pty. Ltd. and has been in the company yard since then. Recently it was refurbished and lent to the Puffing Billy Preservation Society of Melbourne for display at a Christmas Fair organised to raise money to re-open the line between Belgrave and Emerald Lake which was closed in 1958 to enable the extension of electrification to Belgrave. Volunteers, assisted by Army Engineering Units, are hoping to restore the 2-ft. 6-in. gauge track.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

VICTORIA

Standard Gauge Progress

The rate of track laying on the Melbourne-Albury project is being progressively increased. In recent months the rate has been stepped up from 1½ miles of track a week to three miles a week. Already over 25 miles of track have been put down at four locations between Benalla and Wodonga, and material for a further eight miles has been laid out. The line should be completed and the first freight trains should run at the end of next year over the 180 miles of new track between Melbourne and Wodonga, near the River Murray. To the end of September, the project had cost some £6·5 million.

SOUTH AFRICA

New Road Vehicles

Delivery has been taken by the South African Railways of 11 Mercedes-Benz 120-h.p. mechanical horses and ten 2,000-gal. semi-trailer tankers for the bulk transport of fuel. The horses cost £1,697 each and the trailers £1,510 each. Four of the units will be allocated to Durban, three to Bloemfontein, two to Johannesburg, and one each to Pretoria and Cradock. The horses have semi-forward control drivers' cabs and five-speed syncromesh gearboxes. Re-circulating ball-type steering will give easier control, while an engine booster brake will facilitate and improve braking. The trailers were built locally by J. Brockhouse (S.A.) Limited. A further order has been placed for the supply of 40 mechanical horses which will be delivered in the first quarter of 1961.

Electrification Progress

Fifteen per cent of the total rail mileage controlled by the South African Railways is already electrified and new sections are being added; the Witbank - Broodsnyersplaas - Welgedag section about to be commissioned and the Touws River-Beaufort West section in about a year's time. Copper wire and cables in the circumstances represent an almost major requirement. During 1958-1959 the South African Railway Administration bought copper wire and cables for electrification projects to the value of £904,782 while up to the end of October this year, expenditure on these items totalled £345,715.

INDIA

Minimising Transit Delays

The Deputy Minister for Railways, Mr. S. V. Ramaswamy, said in Parliament recently, that a standing committee of two officers from the operating and commercial departments would be set up on each of the eight zonal railways to deal with matters arising out of transit delays in parcels and goods traffic. The committee, he said, was to consist of two senior scale officers, one from the operating and the other from the commercial branches of each railway. He added that *inter alia* the committee was required to review the period of passage of consignments on the various sections and take steps for improvement as might be necessary and further ensure that the steps taken were regularly and correctly enforced.

Broad-gauge Line Construction

The construction of a new broad-gauge line from Khejuriaghat to Malda is nearing completion and its further extension up to Siliguri is likely to be completed some time next year, depending upon receipt of permanent way materials. The project has been undertaken to develop capacity for movement of oil from Assam. The new route is expected to be shorter by about 14 miles than the existing one *via* Sakrigalighat-Maniharighat.

Railway Equipment Imports Reduced

Preliminary reports regarding purchases made by the Indian railways during 1959-60 indicate that the imported content was further reduced from 9·6 per cent to 8·6 per cent. The value of purchases made during the period by the railways from small scale industry amounted to Rs.194,000,000. This was reported by Mr. S. V. Ramaswamy, Deputy Minister for Railways, while addressing the eighth meeting of the Indian Railways Equipment Advisory Committee held in New Delhi recently. Mr. Ramaswamy expects a further reduction in the imported content of rolling stock and equipment in future now that electric locomotives and equipment for electric multiple-unit coaches are being manufactured in the country.

Steam Traction in Angola

A 10th Class Beyer-Garratt steam locomotive, supplied by Beyer Peacock & Co. Ltd. on the Benguela Railway

IRELAND

First Remote-Control Barriers

The first set of remote-control level crossing barriers in the Republic of Ireland has been installed by Coras Iompair Eireann at a private crossing over the Dublin-Belfast main line of the former G.N.R.(I.) near Dundalk. The barriers consist of two 12-ft. arms, electrically operated from the central signalbox and interlocked with signals. Warning of lowering is by a ring of 10 sec. duration on two bells. The crossing is floodlit at night and there is telephone communication with the central box. In an emergency such as the breakdown of a road vehicle on the railway tracks, a plunger at the crossing can sound an alarm bell in the signalbox.

ARGENTINA

Diesel Coaches for Belgrano Railway

The first units corresponding to the 1,700 million peso contract signed between the State Railways and Ganz of Budapest have been off loaded in the port of Buenos Aires from the vessel *Uruguay*. These are two narrow-gauge motor coaches and two trailer coaches for the

General Belgrano Railway. The motor coaches are equipped with 480-h.p. Ganz-Jendrassik motors and electro-pneumatic transmission, the controls and braking being operated by compressed air. The overall measurements are 25 m. long, 3·70 m. high and 2·80 m. wide. The motor coaches have luggage and postal compartments and seating capacity for 64 passengers, while the trailers will seat 88 passengers each.

Increases for Railway Staff

A general strike of railway employees and workmen has been averted by the granting of a further 13 per cent increase in salaries and wages as compared with those of December 1959. Rates and charges will be augmented shortly to finance this item and also improvements made in services.

Buenos Aires Transport Deficit

Buenos Aires Transport has been able to reduce the estimated deficit on the year's working from 3,392 million pesos to 2,905 million pesos. At the same time, the number of employees and workmen has been reduced by nearly 4,000.

WESTERN GERMANY

Electrification Progress

Electrification of the Federal Railways line is progressing. It is estimated that by the end of 1961 it will include 4,181 km. (over 2,600 miles). By then the electrified lines will amount to some 13 per cent of the entire network. In highly industrialised Nordrhein-Westfalen, electrification will be extended from the present 217½ to 600 miles within the next five years.

ITALY

Refreshment Bar Cars

"Restaurant bar" cars of a type recently introduced between Rome and Bologna are to be included in other services if they prove popular. The cars consist of three ordinary first class compartments, a refreshment and bar compartment, kitchen, and pantry. Both the refreshment and bar compartment and the kitchen are stated to be air-conditioned. A radio set provides music and news. The object of the new cars is to provide refreshments at lower prices than those obtained in ordinary restaurant cars. Catering is by the Wagons Lits Company.

Services to Sardinia

Two ferryboats conveying railway wagons are expected to be placed in service next Spring, between Civitavecchia, near Rome, and Golfo Aranci, in the extreme north of Sardinia. The new ships will have a loaded displacement of 5,000 tons. They will include three rail tracks totalling about 1,000 ft., and will also accommodate 76 motorcars. Although the service is intended mainly for goods, 54 single and 20 double cabins and lounges, restaurant, and bar are being provided for passengers accompanying their vehicles. The ships will be equipped with stablisers. The passenger services provided by motor ships of the Tirrenia Company between mainland and Sardinian ports are to continue. In connection with the nightly sailings between Civitavecchia, near Rome, and Olbia, in the north of Sardinia, the State Railways operate services between Rome and Civitavecchia Marittima and between Olbia Marittima and Cagliari; the service in Sardinia is worked by rail-cars.

AUSTRIA

Higher Running Speeds

Measures to facilitate higher speeds include track improvements to make possible weights of 20 tons per axle. Work is to be completed on all principal main lines, amounting to about 56 per cent of the system., in 1965, and in 1980 on other main lines. Rail-welding is to continue. In the past 10 years the number of rail joints has been reduced by 25 per cent, largely by welding 100 ft. rails.

Elimination of the maximum possible number of joints is expected to be completed in the next 12 years. Speed limits have been increased already by an average of 3 m.p.h. Re-alignment at curves in some 160 places on open line and in approaches to stations, and so on, has enabled speeds to be increased by 10—40 m.p.h.

Publications Received

Geschichte der Eisenbahnen in Tanganyika einst Deutsch-Ostafrika (*History of the Railways in Tanganyika, formerly German East Africa*). By Gustav Röhr. Obtainable from the author at Fliederstrasse 17, Krefeld-Bochum, Germany. 11½ in. x 8 in. 55 pp. Duplicated typescript. Illustrated with photographs, line sketches, and sketch maps. No price stated.—The main interest is in the accounts, derived mostly from German sources, of the constructional problems of the Tanga and Central lines and of the motive power placed in service and financial results under German control before the war of 1914-18; during hostilities Tanganyika fell into British hands and the subsequent history of its railways, now part of East African Railways & Harbours, is told in several publications in English. The illustrations do not do justice to the text of Herr Röhr's monograph.

Wood Preservation.—Those concerned with the use of timber in railway structures and rolling stock will find useful the résumé of activities of the British Wood Preserving Association contained in the progress report by Mr. W. E. Bruce, presented at the Association's 1960 convention. Lists are included of B.W.P.A. leaflets on subjects such as dry rot (Leaflet No.1), preservative specialists and services available (No. 5), the use of creosote oil No. 8), preservatives of the organic solvent type (No. 9), and protecting wood against fire (No. 11). Reference is made to British Standards prepared in conjunction with the British Standards Institution. These include B.S. 1282: 1959, "Classification of Wood Preservatives and their Methods of Application." Short accounts are given of the activities of the Specifications and Technical Committees, and of fencing and marine borer tests now in operation under the auspices of the Service Records & Service Tests Committee. Copies of the report are obtainable from the Association at 6, Southampton Place, London, W.C.1.

Metal-Sprayed Heat-Resistant Coatings.—Methods of protecting steel and iron against high-temperature oxidation, by using the metal-spraying process, are outlined in a leaflet obtainable from Metallisation Limited, Barclays Bank Chambers, Dudley, Worcs. Notes are given on processes affording protection at various temperatures. Among the applications suggested are superheater tubes, boiler fittings, and exhaust manifolds and silencers.

B.E.N. Air Compressors. Leaflet CB 193, "Air Compressors for Industry," issued by B.E.N. Patents Limited, of High Wycombe, Bucks., gives details of the makers' range of units. Data include performance, h.p. requirements, air receiver capacity, dimensions, and weights, with indications of the types of compressor recommended for specific tasks. All specifications are given in both British and metric measurements. Leaflet CB 195, "Portable Air Compressors" gives similar information on the several types of equipment supplied by the firm, also on the most suitable spray guns or compressed air tools to be used with various compressors.

Precision Stud Welder.—An illustrated booklet obtainable from Stud Welders Limited, Wincomblee Road, Walker, Newcastle upon Tyne, 6, describes the manufacturers' Mark 2 stud welder. New features are stated to afford a high degree of precision. Once the apparatus is set up for a given size, the conditions can be repeated exactly and are not subject to variations. Photographic illustrations show the welder used in the horizontal and vertically in the downward and overhead positions, and the design is explained in a schematic diagram.

Rapier Self-Priming Water Pumps.—Particulars of Rapier 4P40 self-priming water pumps, with English and metric capacities, are given in a leaflet issued by Ransomes & Rapier Limited, Waterside Works, Ipswich, or 32, Victoria Street, London, S.W.1.

Calendars for 1961.—We have received calendars for 1961 from Crofts (Engineers) Limited, The Netherlands Railways, the Pressed Steel Co. Ltd., and the Talyllyn Railway Company.

Manufacture of Pre-stressed Concrete Planking

Production of 10,000 sq. ft. of cored planking daily in U.S.A. plant

Gantry moving concreting machine along at a speed of 45 ft. per min.

THE rapid extension in the use of pre-stressed concrete for buildings of all kinds is particularly marked in America. It is mainly in the form of so-called planking, though one of the standard thicknesses of the cored planks is as much as 8 in. The demand is greatest for floors and roofs but the thicker planks are also being used for walling.

To meet these demands a factory has been built in Williamstown, New Jersey, to mass-produce pre-stressed planks in three standard thicknesses, 4 in., 6 in., and 8 in. The standard width of plank is 3 ft. 4 in. Initially, it turned out 5,000 sq. ft. of planking daily, but already the output has been doubled. Other factories in different countries are doubtless producing pre-stressed units in large quantities, but there may be some features of this one of more than ordinary interest. Ten-in. planks are expected to be produced early in 1961.

Concrete Plank Machine

It housed in the first instance a concreting machine of German origin suspended from a gantry crane straddling six pre-stressing beds each 450 ft. long. Carried along over these beds by the gantry travelling at 5 ft. a min., the machine made three trips daily down a different bed each time to deposit concrete at rates regulated to suit the different thicknesses of plank, but aggregating 5,000 sq. ft. a day. Subsequently this 600-ft. shop has been extended to 1,200 ft. and six more 450-ft. pre-stressing beds have been installed. Furthermore another concreting machine is to be installed to raise the output to 20,000 sq. ft. daily, with two-shift working.

The first stage in production is the preparation of the pre-stressing cables, their stringing and tensioning. Each consists of seven twisted wires and has a pre-stress strength of 150,000 lb. per sq. in. and an ultimate strength of 250,000 lb. per sq. in. The stringing is effected with a small petrol-powered tricycle, known as a rabbit, carrying the end of each cable the length of the bed. The rabbit is guided on its course by adjustable horizontal wheels bearing against both sides of the pre-stressing bed. When it reaches the tensioning end of the bed the cable is detached, anchored, and strained in the usual manner, the rabbit meanwhile returning to the anchorage end of the bed for another length of cable.

For the concreting, the machine is fed from a 1 cu. yd. hopper mono-rail-mounted and running from either side of the gantry; it discharges into a series of three other hoppers in the machine which in turn deposit the mix in layers. The front one places a 1½-in. layer of light-weight mix round the pre-stressing cables, the middle one pours concrete in the central or core layer, and the rear hopper deposits a ½-in. surface layer of standard-weight mix. The special cement used gives the concrete a strength of 5,000 lb. per sq. in. in seven days. Vibrators are not used, but instead reciprocating tampers compact each layer of concrete.

Plank Cores and Curing

To form the cores a set of mandrels are specially arranged on the machine so that as it moves along they pass through the central layer of concrete. The mix is sufficiently stiff to retain the shape of the core walls and plank edges. The mandrels for 4-in. planking are circular in cross section but those for 6-in. and 8-in. planks are elliptical.

Curing is effected (*a*) in the usual way for the top surface by soaking from 2 hr. to three days after casting, and (*b*) by flooding the cores one day after casting with the aid of a hose having a branch for each core. The planks are ready for sawing into lengths with a water-cooled power-saw three days after casting.

It is noteworthy that the concreting shop is walled with pre-stressed concrete planking. Normally, 8-in. planks are suitable for floors having unsupported spans up to 32 ft. and for roofs with spans up to 36 ft.

Concrete machine with template positioning cables

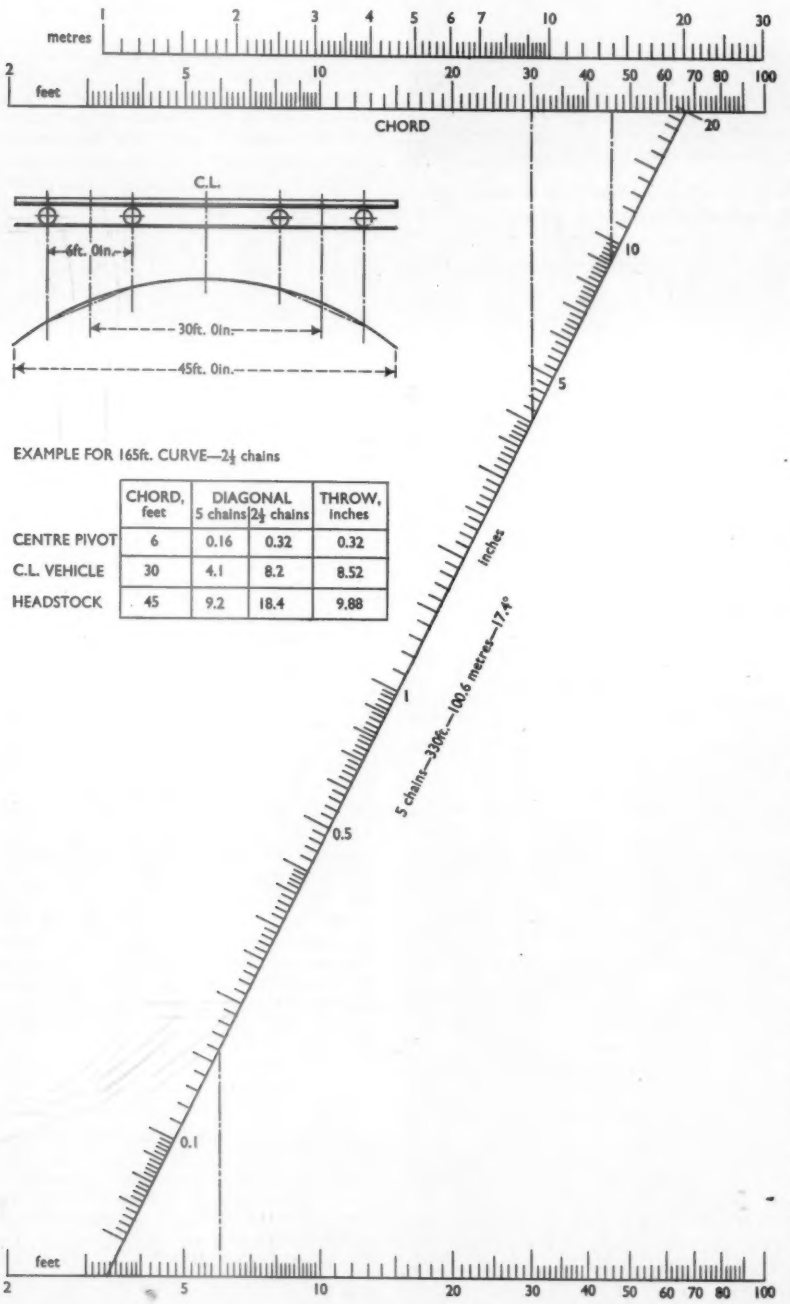
Throwover Chart for Rolling Stock

Simple means of obtaining throwover of a vehicle

By John G. Keith-Hitchens, M.I.Mech.E., M.I.Loco.E.

CHARTS for determining the versine to a curve of a chord representing the wheelbase or length of a railway vehicle are numerous and often some are misleading in use.

The throwover chart illustrated on this page has been in constant use over many years by the author as a simple and straightforward method of obtaining the throwover of a vehicle at its several points up to 100 ft. over buffers and 4 ft. bogie wheelbase on any curve.



EXAMPLE FOR 165ft. CURVE—2½ chains

	CHORD, feet	DIAGONAL 5 chains	DIAGONAL 2½ chains	THROW, Inches
CENTRE PIVOT	6	0.16	0.32	0.32
C.L. VEHICLE	30	4.1	8.2	8.52
HEADSTOCK	45	9.2	18.4	9.88

A straight vertical line cutting both scales at the required chord, wheelbase, or length gives the versine on the diagonal at intersection with the line

The diagonal represents the throwover or versine expressed in inches on a standard 5-ch. curve for chords expressed in feet or metres, and the throwover on any other curve is obtained by simple proportion as given in the example.

To use the chart, a straight vertical line is lain from top to bottom cutting both scales at the required chord, wheelbase, or length and the versine read on the diagonal where it is intersected.

The versine is very closely inversely proportional to the radius of the curve, e.g., a 10-ch. or 660-ft. rad. curve has half the versine of a 5-ch. curve.

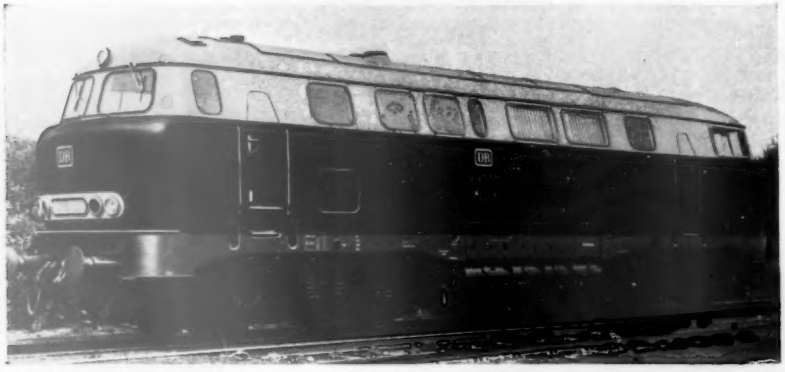
The throwover of the centre pivot of a bogie is then a direct reading for a chord equal to its wheelbase. Similarly, for the centre of a bogie vehicle on a chord equal to its length between centres of bogies, the throwover is the sum of the versines for bogie and vehicle. The throw at headstocks or buffers is obtained by reading the versine on the diagonal for a chord equal to length over headstocks or buffers and deducting the throwover at centre of vehicle previously obtained.

The chords—wheelbase or length—are also expressed in metres to obviate conversion, and curves expressed in degrees or metres may be converted to chains or feet by the formula R in chains equals 86·6/deg.; R in feet equals 5,730/deg.; R in metres equals 1,746/deg. on the basis that a 100-ft. chord subtends an angle of one degree on a curve of 5,730 ft. rad.

ELECTRIC TRACTION DIFFICULTIES.—The British Electrical & Allied Manufacturers' Association has stated that manufacturers are using all their resources, in collaboration with British Railways, to help to solve the special technical problems which have arisen with the introduction of the new electrified services in the Eastern and Scottish Regions. The Association declares that it shares with British Railways concern at the inconvenience to the public. The statement refers to the introduction of "the most advanced techniques under conditions which are not paralleled in any other country," and continues: "More than 600 miles of lines have been commissioned on the high voltage system in two months. It is a basic problem of major alterations to railway systems that complex work had to be carried out while maintaining full services. The new equipment was extensively tested by the manufacturers jointly with British Railways under trial running conditions, but with so many different factors involved the final proving is only possible when all the new equipment is operating together as one complete system. The fullest technical collaboration is being maintained between the manufacturers and British Railways, with every confidence that these particular difficulties will be quickly overcome. Britain's electrical engineering exports depend on technical progress, and problems of this kind are part of the price to be paid for maintaining our leadership."

Standard German Diesel Locomotive

Main-line class of nearly 2,000 b.h.p. with single power plant and 18½-ton axleload



Diesel-hydraulic V.160 locomotive of which 10 are being built for mixed-traffic work on the German Federal Railway

SOME notable features are present in the new standard main-line diesel-hydraulic locomotive of the German Federal Railways. In the first place, only a single diesel engine is used, and though this is of 14 per cent less power than the two power plants in the V.200 locomotives, it is nevertheless sufficient for most of the principal duties remaining on non-electrified lines. Of 1,900 b.h.p., though with an option up to 2,000 b.h.p., this new V.160 unit with 74 tons of adhesion weight and a maximum axleload of 18½ tons is able to take the place of the numerous Class " 38 " 4-6-0 steam locomotives now becoming due for withdrawal, and with an increment in power ; and can also undertake many of the freight duties now in the hands of the Class " 52 " 2-10-0 locomotives.

As a general-purpose machine the B-B type V.160 is equipped with a train-heating boiler, of Hagenuk-Vapor pattern; and included in the all-on weight as given above are 660 gal. of boiler water. Other supplies include 187 gal. of boiler oil and 736 gal. of diesel fuel oil, and 440 lb. of sand, so that the empty weight of the locomotive is no more than 67.5 tons, or 79 lb. per b.h.p.

Though there is only a single engine-transmission group, all axles are driven by cardan shafts and all are connected, so that slipping cannot occur except in relation to wheel-rail conditions applied to the whole locomotive, and not to one axle alone.

Two Gear Ratios

In accordance with recent German Federal Railway practice for line-service locomotives, alternate-speed gears are fitted after the hydraulic portions of the transmission. These give top track speeds of 46 and 75 m.p.h., and continuous rated tractive efforts at the drawbar are respectively 39,300 lb. at 11.8 m.p.h. and 24,400 lb. at 19.3 m.p.h. Starting tractive effort in the low-speed step is 47,000 lb. at 30 per cent adhesion of the weight with half supplies on board; in high-speed step a starting tractive effort of 42,000 lb. can be exerted.

The locomotive design is a double-cab one, with fully welded steel underframe and body frame, and with two U-shaped longitudinals running from buffer beam to buffer beam forming the main members. But between the two cabs the arrangement is unusual in that three separate interconnected rooms have been adopted, and the thick insulation panels extending over the whole of the superstructure sides are extended also to all four cross bulkheads. The locomotive thus is a very quiet one with a low noise level in the driving cabs and a low noise emission to the outside.

Alternative Engines

A Maybach pressure-charged and charge-air cooled engine of model MD.870 is installed ; but following German practice the mounting arrangements, pipe, and cabling connections are standardised so that Daimler MB.839 Ab or M.A.N. model L.12V19.5/21 engines can be used as alternatives in future if so desired. The Maybach engine is set to give 1,900 b.h.p. at 1,500 r.p.m. in this installation, but its U.I.C. rating is 2,000 b.h.p. at 1,550 r.p.m. on a dry weight of 13,000 lb., or 6.5 lb. per b.h.p. This engine has the tunnel crankcase, roller main bearings encircling the disc webs of the crankshaft, two-piece pistons with pressure-oil cooling in a separate circuit, and unit fuel pump-injector assembly for each cylinder which are parts of Maybach standard practice.

In a similar way the Voith transmission in these V.160 locomotives is so mounted and arranged that the Mekydro K.184 transmission can also be used as a standardised alternative. The Voith installation is of model L.218r S., with two torque converters and one fluid coupling, and here takes a maximum input of 1,770 h.p. at 1,550 r.p.m. in the primary shaft after the step-up gear. From the two output flanges which come after the reversing and change-speed gears in the main casing, Gelenkwellenbau cardan shafts lead forwards and backwards to the two bogies, connecting there with bevel-cum-spur axle drives of Gmeinder design.

Auxiliary Power

Immediately behind one of the driving cabs is a small full-width room containing a 22-h.p. diesel-compressor-generator set for the supply of certain auxiliaries. Then comes the engine room, containing nothing but the main engine and its exhaust system, except for a few small auxiliaries such as the pressure-ventilation set for the engine room and fuel-transfer pump. Between the engine room and the second cab is a large compartment housing the top of the hydraulic transmission and, above that, the main cooling group, and to one end the train-heating boiler and its water tank. Control of the speed of the two roof-mounted cooling fans is on the Behr hydrostatic system, and the two pumps for this are driven by belts off one of the transmission shafts.

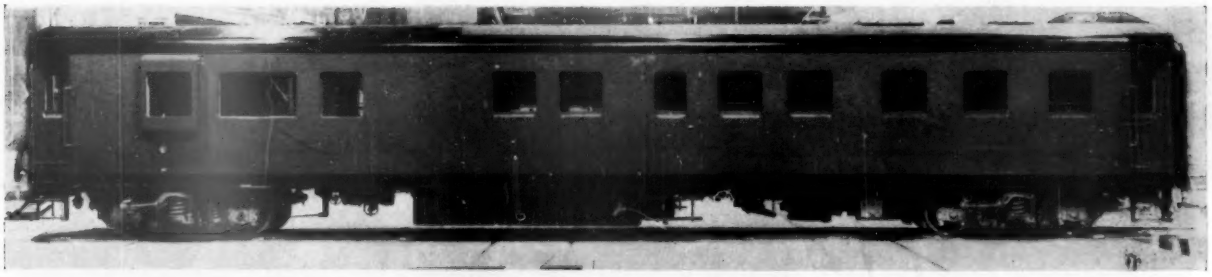
Unlike those of the V.200 locomotives, the bogies have a central pivot, located very low down. The body weight is transmitted through two groups of helical springs at each side, but the roller-bearing axleboxes have individual overhung laminated springs. Transmission of tractive, braking, and lateral forces between axlebox and bogie frame is through a large steel arm embodying the axlebox casting and connected at the other end through a silentbloc type of bush to the bogie frame structure. The Knorr air brakes apply two blocks on each wheel, and each wheel has its own cylinder.

Principal dimensions and particulars not already recorded are : wheel dia. 39.4 in., bogie wheelbase 9 ft. 2 in., bogie pivot pitch 28 ft. 2 in., length over buffers 52 ft. 6 in., minimum curve out on line 660 ft. and in sidings 330ft. radius ; 15-notch control system, multiple-unit control, push-and-pull control, BBC deadman and Indiese a.t.c. apparatus. Of the initial order for ten of these V.160 locomotives six are being built at Essen by the Fried. Krupp Maschinenfabriken and four at Kassel by Henschel-Werke. A full description of these locomotives is given in the November issue of our associated journal, *Diesel Railway Traction*.

GREATER POWER FROM ROLLS-ROYCE DIESEL ENGINES.—Twelve-and-a-half per cent more power for negligible increase in weight is given by two new Rolls-Royce " C " range diesel engines which will become available commercially in the second half of 1961. The engines are the six-cylinder C6.T. Mk.IV and eight-cylinder C8.T. Mk.IV, which have railway-traction ratings of 295 b.h.p. and 394 b.h.p. respectively at 1,800 r.p.m. Individual four-valve cylinder heads allow a more free gas flow.

South African Dynamometer Car

Cape-gauge vehicle for investigation of steam locomotive characteristics



Exterior of the dynamometer car

SOUTH African Railways & Harbours has taken delivery of a new dynamometer car. Intended specifically for the investigation of the performance of steam locomotives, of which there are still 2,700 on the S.A.R., this car can be used also, within its capacity, for the measurement of electric and diesel locomotive speed and drawbar pull. Built at the Kassel-Niederzwehren works of Gebr. Credé & Co. G.m.b.H., the car embodies measuring and recording apparatus of Amsler type, built in Switzerland.

Main equipment is for the measurement and recording of drawbar pull and track speed, so that efficiency and useful range of performance can be established, and for the measuring of thermal losses by means of smokebox-gas analysis. There is an anemometer on the roof. The car also contains accommodation and facilities for the staff. It is of self-supporting lightweight all-steel construction with Visco-Alliance automatic centre couplers and vacuum-brake equipment, and runs on two American-type bogies with cast-steel frames.

The bogie at the instrument end carries special apparatus for accurate track-speed measurement. Necessary electric current for car services is provided by a Stone 110-volt d.c. generator with hypoid-gear drive operating in conjunction with a 480-Ah. battery contained in crates below the underframe.

Accommodation

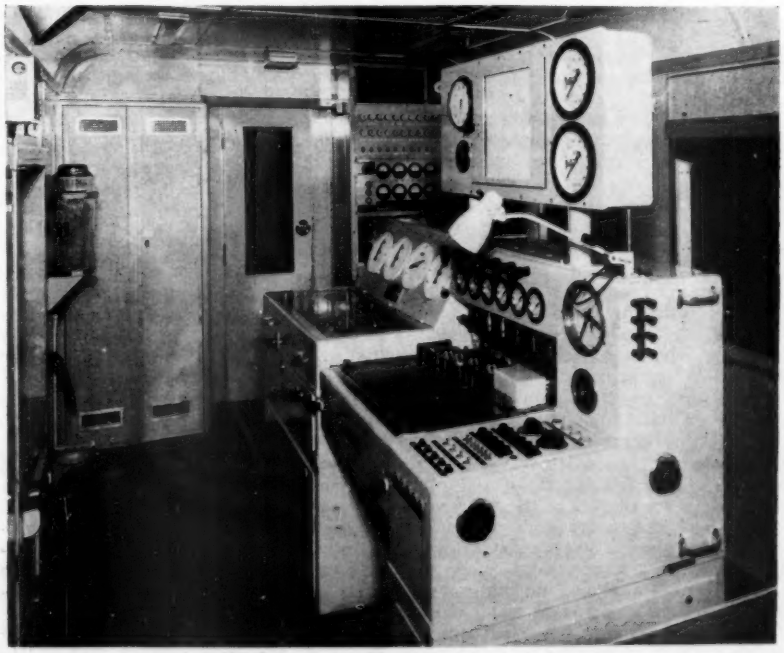
Layout provides instrument room, conference room, workshop-and-equipment section, wash-room with shower and toilet, guard's compartment with toilet, kitchen, and second entrance vestibule and bellows gangway connection. Bellows connection is provided at one end only, as the car records only in one direction. Instrument room and conference room are full width; the others are approached by a side corridor.

The complete Amsler measuring and recording equipment is accommodated in two consoles arranged lengthwise down the instrument room, the observer sitting sideways. The measuring apparatus, with the instrument table at which the results are automatically recorded, and a second table for evaluation of the results obtained, are shown in the view of the main room. A protruding observation window with folding seat is located at each side, and the frame of one of these can be seen to the left of the interior view. A rotary searchlight for spotting roadside buildings, and below it a milestone reading lamp, are arranged at each of these windows. A measuring-apparatus cubicle with electrically controlled calorific appliances is fitted on the partition between instrument and conference rooms, and the back wall of this cubicle can be opened in the conference room. Panels for the extensive electric switch and fuse gear are arranged on each side of the door leading to the measuring end. The air in the instrument room is heated by a hot-air system fitted in the roof. Heated air is led in through the perforated ceiling and, in view of the sensitivity of the instruments, temperature is maintained constantly at 20 deg. C. Lighting fittings are of the fluorescent type, and the room includes a folding wash basin with cold and hot water and a drinking-water vessel.

Workshop/Darkroom

Workshop equipment, is accommodated in a room with access direct from outside by two side doors, as well as from the adjacent rooms. This room has continuous lockers for the storage of components and fittings, and its windows can be darkened by light-tight aluminium slide plates so that photographic work can be performed.

Interior walls and equipment in the kitchen are stainless-steel lined. Water is carried in one large tank slung below the underframe, and is raised by hand-pumping to the various roof tanks. An ice-box is fitted below the fixed settee in the conference room.

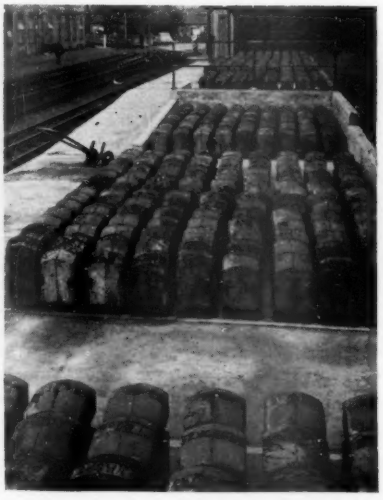


Consoles of the Amsler recording apparatus in main instrument room

Artificial Loads for Railway Rolling-stock Tests

Improved method introduced by L.T.E. to facilitate rapid test-loading and unloading of eight-car trains

Cast-iron weight being removed with two-wheel fork hand barrow



Stock of iron weights on rail-side platform at Ealing Common

THE London Transport Executive has introduced a convenient method of loading trains artificially to simulate service conditions. Artificial loads are frequently required in the course of testing rolling-stock of new design, in the development of improved methods of braking, and for other test purposes.

Past practice has been to use cast-iron brake blocks from store as the load. As more than 6,500 blocks are needed for an eight-car train of "surface" stock, this method is cumbersome and involves disproportionate handling costs.

To make test-loading easier, London Transport has introduced 2½-cwt. cast-iron weights which are stored on a special rail-side platform at Ealing Common Depot. Slots in the sides of the weights take the forks of two-wheel fork hand-barrows of simple design.

Two-level Loading Platform

One end of the platform is at a level suited to surface stock and the other at a height to serve tube stock, the two levels being connected by a ramp. Portable bridge-plates span the gaps between platforms and railway cars. After experiment, the weight of 2½ cwt. was chosen as being the convenient maximum; it also is a weight lending itself to simple calculation of loads and represents the approximate weight of two passengers. In all, 704 weights have been provided, giving a maximum test-load of 88 tons. By the new method, an eight-car train can be loaded or unloaded for test purposes in well under half the time required when brake blocks were used.

The system was devised to the requirements of Mr. A. W. Manser, Chief Mechanical Engineer (Railways), London Transport Executive.

Permanent Way Maintenance in Australia

Laying of pre-fabricated track on the Trans-Australian Railway

PERMANENT way maintenance and the relaying of track in the areas served by the Trans-Australian and Central Australia Railways presents problems which have been accentuated by the difficulties of securing and retaining a satisfactory labour force. Within the last year a method has been developed for laying of pre-fabricated track which is prepared in a depot where staff is available in sufficient numbers. The pre-fabricated track is built on a rake of flat cars at the welding depot, Port Augusta, for transportation to the relaying site. These sections are made up into 270-ft. lengths of welded rail.

Two tiers of the completed track sections are made up on the flat car rakes, using Jarrah sleepers and 94-lb. rails. The bottom tier is built over skid rails, which run the full length of the rake similar in every respect to the piggyback trains used during the construction of the Stirling North to Marree railway. The sleepers are pre-bored, and the welded rails are placed in position by overhead electric hoists at the welding depot. Spike driving is carried out by means of 90-lb. rivet guns or demolition hammers, operated by compressed air. When loaded, the welded-rail train has no difficulty in negotiating eight-chain curves. The upper tier simply lies on the rails of the tier below it.

Method of Laying

The work train, loaded with the pre-fabricated sections, is taken to the relaying site and the top tier is anchored to the existing track by cables and sheave. The train slowly moves forward over the length to be removed and the new section is paid out in the approximate position that it will occupy in the roadbed. While the new track is suspended, and just before it is layed on the formation, the old sections of track are hauled sideways by a bulldozer. The fishplates being first removed, the rail length panels are extracted in one piece to avoid crippling of the rails. In this way, the new section of track drops into place. All track-laying is done during the hours of darkness using portable floodlights to ensure maximum track occupancy by the engineering staff.

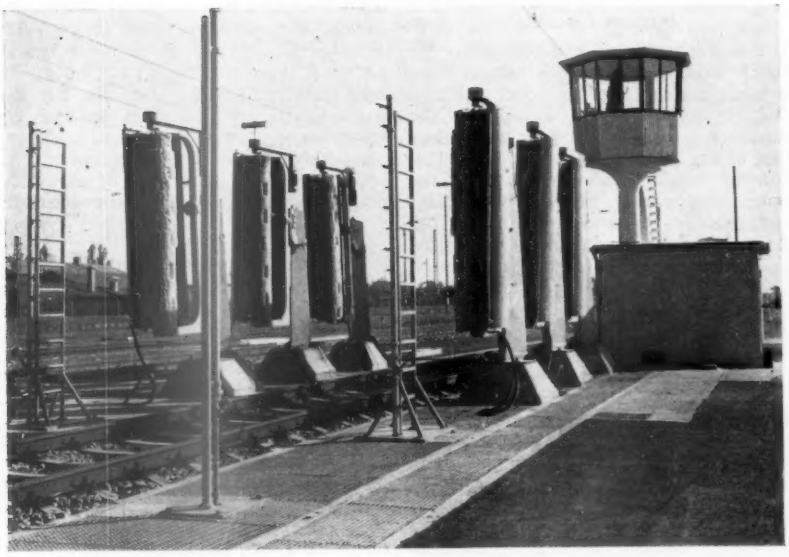
A ballast plough is later dragged under the new section to ensure a solid base for subsequent packing. The ploughed out ballast is used for the track shoulder and is positioned by a ballast regulator. New centre ballast is added, the track is lifted, completely welded, and finally machine tamped to give a first class track surface suitable for high speed running.

Between May and the middle of August this year, the Commonwealth Railways had renewed over 15 miles of track between Port Pirie and Port Augusta, with labour costs halved when compared with orthodox methods.

ADDITION TO CHARLES CHURCHILL GROUP.—Charles Churchill & Co. Ltd. has announced a further addition to the group in the incorporation of Denham's Engineering Co. Ltd., lathe manufacturers of Halifax. While the company's range of general purpose lathes will be continued, the manufacturing capacity will be expanded to enable the production of other machines, within the range handled by the Charles Churchill Group, to be undertaken. Mr. Roy S. Denham, Chairman & Managing Director, will be retiring. All other members of the management are remaining with the company.

Open-air Carriage-Cleaning Plant

Economical equipment installed at Augsburg particularly for suburban and local-line coaches



Layout of cleaning plant, showing control tower

THE new open-air carriage-cleaning plant recently brought into use at Augsburg by the German Federal Railway is a trial installation designed to demonstrate whether an open-air plant of this nature can be successfully used in a climate which in winter can be fairly severe, and whether such a plant is economic for a depot dealing with about 300 two- and three-axle coaches, most of which are engaged in suburban traffic with marked peaks.

Construction of Carriage Sidings

Some time ago it was realised that to improve the operating efficiency of the Augsburg main station it would be necessary to build a major group of carriage sidings. The extent of these sidings, which, ideally, should have been large enough to stable all the stock required, was limited by existing buildings, so that it was necessary to build an additional group of three short sidings to the north of the main station. Also, all trains with short lie-over times, as well as coaches held in reserve, must remain at the station itself. In general, trains entering the station from the north are hauled onwards to the south sidings by the train locomotive. Those entering from the south in the peaks pass through the station to the three sidings built to the north of the main station.

Before the new washing plant was built, there was some doubt that carriages following these various routes could all be brought regularly to the plant in the south sidings. Previously, the only frequent cleaning had been confined to windows. The sides and ends, under frames, and so on were cleaned only every 10 days for main-line vehicles, or 20 days for local vehicles. The problem was made more difficult because the coaches working on steam-operated lines had steam heating only and could not be interworked with those used on the electrified lines.

Schedule of Rolling Stock

By changing the steam-heated coaches for others equipped with both steam and electric heating it became possible to schedule all coaches for any type of service, and to arrange the schedules so that once every two days or so each train passed through the south sidings for cleaning purposes, remaining there for at least three hours. Because of the peak nature of the train service, the trains arrive at some periods more quickly than they can be dealt with, and consequently must be stored. To reduce shunting movements these train sets are sometimes coupled up together into longer trains of up to 28 coaches with a weight of 470 tons. These trains are shunted through the washing plant and dealt with in a single through run. Seven runs in a nine-hour shift enable some 130 of the 300 vehicles based on Augsburg to be washed and cleaned each day. This means that, on average, each coach is cleaned every 2½ days instead of every 20 days as before. Despite the great improvement, it has been possible to dispense with two window-cleaning teams, each of five men, and an exterior cleaning gang of six men.

Location of Cleaning Plant

The carriage-cleaning plant is on a separate through road at the west side of the carriage sidings. A train is brought in by a shunting locomotive and reaches first a washing platform, 110 ft. in length, where the underframes and w.cs. of the coaches are cleaned. At 40-ft. intervals are three washing points, each fitted with 33-ft. hoses. These enable three coaches of average size to be dealt with at the same time. The hoses are fitted with spray pistols and normally use cold water, but in cold weather they can also be supplied with warm or hot water. A high-pressure boosting pump is fitted which switches on automatically when the triggers of the spray pistols are depressed.

Spraying Apparatus

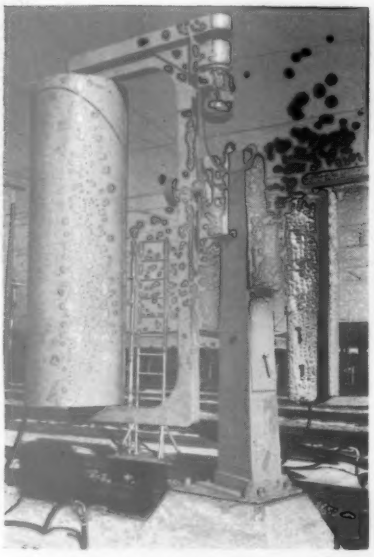
As well as the hoses, there is a special spraying apparatus mounted below the tracks at the entrance to the platform. It consists of four parallel spraying pipes each with 16 upward-pointing jet nozzles. The spray from these pipes effectively washes the undersides of coaches as they pass over them. For w.c. cleaning the coaches must be brought to a stand; the work is then carried out by two men who, at a later stage, also clean the ends of the coaches, which cannot be reached by the rotary brushes of the main cleaning plant.

When the coaches have been dealt with at the w.c. and underframe cleaning platform, they are pushed through the mechanical washing plant itself at a speed of 0·5 m.p.h. They reach first a portal framework consisting of spray pipes on each side of the track which wet the sides and roof of the coaches as a preliminary to washing. The sprays also, in summer, cool off the skin of the vehicle enough to prevent the chemical spray applied at a later stage from evaporating too quickly and thus becoming too concentrated. Experience has shown that a single spray portal is not sufficient and a second set has been installed 65 ft. beyond the first.

Chemical Spray

Next in order comes the chemical-spray point, 75 ft. beyond the second portal spray, where, on each side of the track, is a vertical 2-in. pipe fitted with five spraying nozzles. To prevent the undue spread of the chemical spray, a sheet-metal housing, complete with side wings, is installed for each vertical pipe. Inside the housing, at the side of the spray pipes, are ladders for use in cleaning the nozzles. In windy weather, the housings are insufficient to confine the whole of the spray cloud and a better method of shielding is being sought. The chemical used is Ultra 18 in a 0·33 per cent solution. Gratings are fitted at ground level round the vertical spray pipes to allow the solution draining off to be collected in a sump.

The first pair of rotary brushes comes 130 ft. beyond the chemical sprays. This gives sufficient time for even firmly-adhering dirt to be softened by the solution. The three pairs of rotating brushes, made by Kullen of Reutlingen,



Cleaning brush, showing frame-mounted motor and pivot arm

are at the centre of the cleaning plant. They stand on concrete bases 11 in. above rail level, and the brushes themselves are carried on a vertical spindle mounted in a frame which is free to swing both vertically and horizontally so that the brush can conform to the shape of the coach sides, whether vertical or not. The pivots are rubber-loaded so that the brush and its frame automatically return to the normal position when not in use. The spindles of the vertical brushes are fitted with roller bearings at their upper and lower ends, and a metal spray shield is provided which fits half round the brush, shielding the side away from the coach. Improvements to the pivot-mountings are under consideration. The brushes are each driven by a 3·6-kW. electric motor mounted on the frame itself and running at 315/1,400 r.p.m. Belt drive is used between the motor and the brush spindle.

Cleaning Brushes

The brushes are 8 ft. 4 in. in length and 1 ft. 9 in. in diameter and are built up of 12 separate sections each 8 in. long. Each section is itself in two separate segments. When not in use, the brushes are held clear of the track, but when a train is to pass through they are swung into the operating position by compressed air and are pressed against the sides of the vehicle with a force of about 110 lb. Compressed air has been chosen for this duty because an electro-magnetic apparatus used in an earlier plant at Munich has not behaved as well as had been expected. The air-cylinder which controls the brush-mounting movements to and from the sides of the coaches is located in the upper section of the brush-mounting base.

The first two brushes turn in the direction of the coach travel and their main duty is to move dirt by the friction or rubbing of the brushes against the coach sides. If required, these brushes can be supplied with the chemical solution in place of the usual plain water.

The function of the second pair of brushes is washing, as distinct from the dirt removal purpose of the first pair. The washing brushes turn against the travel direction of the coaches and are supplied with a strong flow of water to wash off chemical solution and dirt together.

Window Cleaning

The third pair of brushes cleans the coach windows. For this reason these brushes are mounted at window height and are only 3 ft. 6 in. in length. The diameter, however, is slightly larger than that of the other brushes, *viz.*, 2 ft. This pair of brushes also turns against the direction of travel. They can be supplied with heated water in cold weather so that if necessary the windows can be cleaned in temperatures well below freezing point.

The sets of rotating brushes are 10 ft. apart; and 13 ft. beyond the last pair is a rinsing point with vertical 2-in. pipes rising on each side of the track. Each of these pipes has 17 nozzles from which strong streams of water are directed on to the coaches to get rid of any remaining dirt. Like the chemical spray pipes, these pipes are fitted with ladders to simplify nozzle cleaning.

Another 13 ft. brings the coach to a further spraying point, but in this case the sprays are directed only on to the windows of the coach. These sprays can be fed with soft water, or water to which a suitable additive has been introduced, or with ordinary clean water. The soft or treated water is intended to prevent lime deposits or " water run " on the glass of the windows. The passage of these seven sets of apparatus completes the cleaning process and the coaches are then ready to be returned to traffic.

Control Tower

The whole plant is controlled from a tower with the attendant's position, 20 ft. above ground level, reached by a staircase. The tower is situated so that the attendant can see every brush at work as well as approaching sets of coaches. He can also keep in touch by radio with the driver of the shunting locomotive propelling the coaches. It is most important that the attendant should have a clear view of the brushes, for if they do not swing in and out at the proper time they are liable to rapid wear and to require replacement long before they should.

The attendant's console in the control tower is parallel to the rails and has separate push-buttons or switches for all valves, and for the movement of the brushes into and out of the operating position. All electrical circuits have their own pilot lamps to show whether they are functioning correctly. Additional controls are fitted for an optical stop-go signal, a siren, and a floodlight. These refinements are not yet fitted, but the controls are included in case operational experience shows them to be desirable. The tower has electric heating.

Under the tower are two rooms, in one of which is the relay and power distribution apparatus and two pumps for dosing the water for the chemical sprays with Ultra 18 and Pril (Pril is used for the window spray). In the second room are the dosing tanks, each of 64-gal. capacity. The rate of flow through the tanks can be regulated as required and from the tank the solution is passed over filters, through fine-dosing apparatus and pump and thence to the sprays. Any solution which runs off the vehicles is collected in channels below rail level on both sides of the track. It then runs into a sump where the dirt has a chance to settle out and can then be re-circulated. In wet weather, however, when the solution would be too diluted by rain to be a great deal of use, it is allowed to flow away into the drainage system.

Supply Services

The main assembly of pipes and valves needed to supply the plant is situated in a basement underneath the two rooms already described. All connections are laid out for easy accessibility and follow the general sequence of the items of plant which they serve. Another basement room contains a pump which can be used to boost the town supply pressure in case of need to ensure that proper pressure is always available in the various lines. At present, the pump is switched on and off by the attendant from his console in the tower, but later arrangements will provide for the pump to be switched on and off automatically by variations in water pressure.

In principle, the washing plant is capable of dealing with diesel and electric railcars and railbuses, as well as normal coaches of various types. However, the paint currently used on the railcars is particularly sensitive so that only a weak chemical solution or even plain water can be used in the washing process. The railbuses also have deeper sides than normal coaches, so that longer brushes with their lower ends nearer rail level would be required to deal with them properly.

This new Augsburg plant is to be used normally for 10 months in the year, but the proposals are to close it down because of frost in the other two months. Freezing of the jets occurs at other times, but this can be remedied by using a steam jet supplied with steam from the nearby train pre-heating plant.

L.T.E. Electronic Eye Bus Control Extended.—The London Transport Executive is planning to extend its experimental system of electronic eye bus control, which has been in use on the No. 74 (Camden Town-Putney) route for the past three years, to cover five more busy Central London routes.

The equipment, bus electronic scanning indicator, for the five routes should be in use towards the end of next year. It helps to fill gaps in the service caused by traffic jams. An electronic eye on a bus stop or building picks up a signal from " cat's eyes " on the side of a bus and passes it on to a controller at headquarters. The five new routes are: Nos. 6 (Kensal Rise-Leyton), 13 (Golders Green-London Bridge), 28 (Golders Green-Wandsworth), 31 (Camden Town-Chelsea) and 73 (Stoke Newington-Hounslow).

RAILWAY NEWS SECTION

PERSONAL

Mr. P. Sahai, Divisional Superintendent, Northern Railway of India, who was appointed Chief Mechanical Engineer, South Eastern Railway, earlier this year, was trained at Jamalpur and in the workshop of the London Midland & Scottish Railway at Derby. On return to India he joined the Mechanical Department of the former East Indian Railway and served as an Assistant and senior scale officer in the workshop and on the line. In 1951 he was appointed Officer-On-Special-Duty in the Railway Board to rationalise the requirements of power on Indian Railways. In this capacity he conducted extensive trials on the different sections of the Indian Railways to determine the loads and types of locomotives best suited to the local conditions. Mr. Sahai was one of the three members of the Railway Delegation which went to Russia in 1954 to study the working of Soviet Railways. During this tour, the Delegation visited several other European countries to study different aspects of Railway working. On his return to India he was appointed Joint Director, Mechanical Engineering, Railway Board, and was closely associated with the formation of the Railways Second Five Year Plan. In 1956 he went to America with the Railway Delegation to negotiate a loan with the World Bank for financing the Railways plan. He was appointed Divisional Superintendent of the Northern Railway in 1957, the position he has vacated to take up his new duties with the South Eastern Railway.

Mr. P. Sahai
Appointed Chief Mechanical Engineer, South Eastern Railway of India

The late Mr. H. F. Varian, M.I.C.E., F.R.G.S., formerly Chief Resident Engineer (Construction) of the Benguela Railway Company, whose death at the age of 84 was recorded in our December 23 issue, began his engineering career as a special nominee with the Public Works Department, Civil Service of Ceylon, but had to return to England before his training was complete. He went to Portuguese East Africa in 1898, and was appointed Assistant to the engineer in charge of the re-alignment of sections of the Beira Railway, then under reconstruction. His first big assignment was to raise the line above the level of floods on the Pungwe River flats. Subsequently he became Assistant Engineer for the construction of the Victoria Falls Bridge, and, after working on the extension of the Bulawayo line of Rhodesia Railways northward and across the Kafue River to Broken Hill, he made a complete survey of the falls which was published by the Royal Geographical Society. On the completion of his work at Victoria Falls, Mr. Varian was put in charge of the construction of the first section of the Gwelo-Blinkwater line. In 1908, he was appointed Chief Resident Engineer of the Benguela Railway Company, and continued in that capacity until the outbreak of hostilities in 1914, when he returned to England and joined the Royal Engineers with which he served in France and Belgium. After the war he returned to his former position with the Benguela Railway. In 1927 he was commissioned by Tanganyika Concessions to make a report on the possibility of railway connections between mining centres and prospecting districts in Kenya, Uganda, and along the Congo border. Mr. Varian was a Member of the Institution of Civil Engineers, a Fellow of the Royal Geographical Society and a Life Honorary Member of the American Museum of Natural History. He was the author of *Some African Milestones*, an autobiographical account of pioneer railway construction, survey work, and exploration in Africa, published by the firm of George Ronald, Oxford.

Mr. A. R. Mitchell
Appointed Chief Controller of Stores, Eastern Bengal Railway

Mr. Arthur Richard Mitchell, Deputy General Manager (Works), Eastern Bengal Railway, who, as recorded in our November 18 issue, has been appointed Chief Controller of Stores, Eastern Bengal Railway, was educated at Ootacamund and Simla, and obtained his Civil Engineering Degree at Roorkee. He was appointed by the Public Service Commission to the North Western Railway as a Probationary Assistant Engineer and joined that railway in 1937. After working on the Sind Right Bank Feeder Railway survey and construction until March, 1940, he joined the Quetta Division as an Assistant Engineer later that year. In 1941 he joined the Indian Army with 101 Railway Construction Company, Q.V.O.M., S. & M., with which he served until he rejoined the North Western Railway in April, 1946. During his war service, Mr. Mitchell worked on major railway operations in Iraq, Eritria and Egypt, and on the Mersa Matruh—Tobruk, Benghazi—Barce, and Haifa—Beirut — Tripoli Railways. From 1946 to 1950, he worked as Divisional

Mr. W. E. Grainger

Appointed Divisional Traffic Manager, Barrow, London Midland Region

Engineer, Quetta, and later as Executive Engineer (Bridges). He was promoted to the Junior Administrative Grade as Deputy Chief Engineer in 1950, and in 1952 he was transferred to the Stores Department as Deputy Chief Controller of Stores, North Western Railway. Subsequently he became Controller of Stores, Eastern Bengal Railway, and in 1958 he was appointed Deputy General Manager (Works) of that railway. He was promoted to be Chief Controller of Stores in 1959.

Mr. J. K. McAlpine is to succeed Mr. M. Moohan as Minister in Charge of the New Zealand Government Railways. Mr. McAlpine held the portfolio of Railways in the previous National Government. His portfolio will embrace all forms of transport in the Dominion.

On January 17, at the general meeting of the Institution of Locomotive Engineers, Mr. J. F. Harrison will be proposed as President for the session 1961-62, commencing June 1. Mr. G. Collingwood and Mr. S. B. Warder have been nominated as Vice-Presidents, and Mr. H. H. C. Barton, Mr. M. G. Burrows, Mr. A. H. Emerson, Mr. T. C. B. Miller, Mr. W. L. Topham, Mr. E. D. Trask and Mr. F. Whyman have been nominated as Members of Council.

Mr. W. E. Grainger, Assistant Divisional Traffic Manager, Barrow, British Railways, London Midland Region, who, as recorded in our December 23 issue, has been appointed Divisional Traffic Manager, Barrow, began his transport career with the former L.M.S. Northern Counties Committee at York Road, Belfast, as an apprentice in 1933. After serving his five-year apprenticeship he gained experience at Wakefield Motive Power Depot, at Divisional offices at Manchester and Crewe, and at Headquarters at Euston. From 1941 to 1945 he was Running Shed Foreman at Crewe South, Swansea, Tebay, Plodder Lane, and Stirling. He was appointed Mechanical Inspector at Glasgow in January, 1947, and, in 1948, became a member of the Motive Power Staff Commission for the Scottish Region. After serving as Locomotive Shedmaster at Motherwell and Kings Cross he was appointed in 1954 Junior Assistant in the Motive Power Superintendent's Office at Euston. A year later he became Assistant Motive Power Superintendent at Edge Hill. Mr. Grainger was appointed District Motive Power Superintendent, Springs Branch, Wigan, in 1956, and was promoted to be Assistant Divisional Traffic Manager, Barrow, in 1957.

Mr. E. P. Rogan has been appointed a Commissioner of the Victorian Government Railways, Australia.

Sir James Dunnett, Permanent Secretary to the Ministry of Transport, has been appointed a member of the Economic Planning Board.

We regret to record the death of Mr. J. S. Lewis formerly London Secretary of the Midland Railway Company of Western Australia.

Mr. E. Dalton, Assistant to the General Manager (General), York, British Railways, North Eastern Region, has been appointed Assistant Commercial Officer, York.

The Council of The Institute of Metals has elected Professor W. Hume-Rothery, Isaac Wolfson Professor of Metallurgy in the University of Oxford, as an Honorary Member of the Institute. The Council has also elected Major C. J. P. Ball, Dr. Maurice Cook, and Lt.-Colonel S. C. Guillan, as Fellows, in recognition of the services that they have rendered to the Institute.

Mr. Roy M. Wilson, Q.C., has been appointed president of the Industrial Court in succession to Lord Forster, who retires at the end of the year. He has been Recorder of Croydon since 1957.

B.T.C. Appointments

The British Transport Commission has announced the following appointments:—

Finance Department

Mr. G. A. Hughes, Traffic Costing Officer, B.T.C. Headquarters, to be Traffic Costing Officer, Birmingham.

British Railways Research Department

Dr. L. C. F. Blackman, Lecturer, Imperial College, London, to be Assistant Director, Chemical Services Division, Muswell Hill.

British Railways Central Staff

Mr. T. S. Hough, Projects Engineer (Design), Leyland Motors Limited, to be Assistant Projects Development Engineer (Design), Stooperdale Works, Darlington.

Electrical Engineering Department

Mr. J. K. Brown, Metropolitan Vickers Electrical Co. Ltd., to be Principal Scientific Officer, Electric Traction Research Section.

County Alderman B. H. Rockman has been appointed a member of the Transport Users' Consultative Committee for the London Area as a representative of labour until February 28, 1962. He replaces Councillor H. Solomons who has resigned on medical advice.

Mr. J. H. Griffin, M.B.E., M.Inst.T., Superintendent (Running), Central Road Services, London Transport Executive, who retires on December 31, joined the London General Omnibus Company in May, 1911, at Upton Park garage and has worked in every section of the road services operating department. He became Assistant to the Staff Superintendent in 1934. He served in both world wars, and, during the 1939-45 war, was in Italy from 1943 to 1945, reaching the rank of Lieut.-Colonel. He was awarded the M.B.E. (Military Division) and was mentioned in despatches. When he returned to the L.T.E. he was appointed Divisional Superintendent "A" (Central Buses), and on the reorganisation of the Operating Department in 1950 he became Divisional Superintendent (South West) in which capacity he assisted with the South London Tram Conversion Scheme. He was appointed to the newly-created post of Superintendent (Running) in 1957 to co-ordinate and develop measures for improved regularity of bus running in the Central Road Services area. He has been associated with the development of the L.T.E. Bus Electronic Scanner Indicator since its introduction. Mr. Griffin is President of the 89/7 Combined Division, St. John Ambulance Brigade, Chairman of the London Transport Ambulance Centre (South West District), and Vice-President of the Auxiliary Omnibus Companies' Association.

Mr. F. V. Spillard

Appointed District Traffic Superintendent, Exeter Southern Region

Mr. F. V. Spillard, Senior Assistant District Traffic Superintendent, Redhill, British Railways, Southern Region, who, as recorded in our December 2 issue, has been appointed District Traffic Superintendent, Exeter, was educated at Skinners' School, Tunbridge Wells, and joined the former South Eastern and Chatham Railway as a probationer in 1919. After three years' training in Station and District Office working he was appointed to the Operating Department of the Superintendent of the Line's office in 1922, and became Outdoor Assistant to the Superintendent of Operation, Southern Railway, in 1938. He served throughout the 1939-45 war in the Movements & Transportation Branch, Royal Engineers, was Mentioned in Despatches for services at Dunkirk and retired from the Army with the rank of Colonel in 1946, when he returned to the Southern Railway as Assistant to the District Traffic Superintendent, Orpington. In 1948, he was appointed Assistant District Traffic Superintendent, Southampton, and transferred in 1954 to Redhill, where he became Senior Assistant District Traffic Superintendent.

Mr. F. A. White, who has been appointed Principal Executive Assistant in the Traffic Superintendent's Office, Department of the Operating Manager (Central Road Services), London Transport Executive, joined the London General Omnibus Company in 1918 as a garage clerk. He subsequently worked in both the Operating and Engineering Departments. He assisted with plans for evacuation in 1939 and after the war handled the traffic work associated with the South London Tramway Conversion.

NEW EQUIPMENT AND PROCESSES

Steam Trap

MIL THERMATIC steam traps for heating and processing plant are of simple and compact construction designed to discharge condensate at steam temperature consistently, from no load to full load.

Each unit consists of six components, of which the valve is the only moving part. The internal items are of high-grade stainless steel, and the body materials may be either manganese-bronze forgings or stainless-steel castings. All mating surfaces are metal-to-metal contact to eliminate the use of gaskets.

Steam traps with manganese-bronze body are suitable for operating pressures across the trap from five to a maximum of 250 lb. per sq. in., at which the maximum continuous discharge capacity is 2,120 lb. per hr. Those with stainless-steel body can operate at up to 400 lb. per sq. in. with a maximum discharge capacity of 2,300 lb. per hr.

Further details may be obtained from the manufacturer, Midland Industries Limited, Heath Town Works, Wolverhampton.

Positive-Displacement Pumps

VIKING pumps, of the positive - displacement type, are to be produced under licence in this country by Zwicky Limited.

The pump works on the "gear-within-a-gear" principle and has only two moving parts. Capacities range from ¾ gal. per min. up to 1,050 gal. per min.

Further details may be obtained from Zwicky Limited, Buckingham Avenue, Slough, Bucks, the sole manufacturer in this country of the full range of pumps designed by Viking Pump Company, Cedar Falls, Iowa, U.S.A.

Multi-Purpose Gas Torch

THE Harris-designed Type 43 universal pressure torch, introduced by British Industrial Gases Limited, is suitable for welding, cutting, heating, flame-cleaning, gouging, and rivet-washing.

It can operate on low-, medium-, or high-pressure fuel gas, and can use acetylene, propane, butane, hydrogen, or town gas. The torch works on fuel-gas pressures of 6 oz. upwards, and low-pressure working is claimed to produce savings up to 15 per cent on fuel gas.

The tool is claimed to be the first in this country to use "O" rings to seal all joints, and to gouge and rivet-wash making use of oxy-acetylene or oxy-propane.

Acetylene, propane, or hydrogen may be chosen for heating, and welding and cutting can be carried out with high-pressure or low-pressure fuel gas, all on one master shaft.

A swivel-mounting is provided to enable the welding, cutting, or heating attachment to be pointed in any direction during use. A wide range of flame settings is obtainable with each nozzle, of which a full set is available.

Further details may be obtained from British Industrial Gases Limited, 700, Great Cambridge Road, Enfield, Middlesex.

Plug and Pin Gauges

APWAR LIMITED has introduced a range of plain plug gauges and reversible pin gauges. They are manufactured to conventional taper-lock, tri-lock, and reversible-pin designs. Consistent adherance to rigid technical standards is claimed in respect of sizing, finish, and hardening, the surface finish, for example being maintained to within one micro-in.

All handles are of light-weight aluminium alloy, those for the taper-lock and tri-lock gauges having a standard finish of oxydised blue to present an attractive appearance. It is claimed that this feature results in more care being taken in the use of the gauges, with consequent longer effective life. Handles of black or other specified colours are available if required.

The plain plug gauges can be of nitralloy or with hard chrome finish and optionally with piloted gauging members.

Further details may be obtained from Apwar Limited, 37, Sheen Road, Richmond, Surrey.

Multi-Jack Revolving Table

A NEW design of revolving table using a patented multi-jack lifting arrangement is now available for Kearns horizontal boring machines. The table, which is made in a variety of sizes from 3 ft. to 6 ft. square, is of cellular construction, well ribbed, and the metal distribution ensures a high-quality casting, combined with maximum strength.

The lifting arrangement includes a screw and nut arrangement which draws a precision roller chain round several sprockets. Each sprocket forms part of a carefully placed jack-lift, which transmits the load to a large diameter ball track and lifts the revolving table clear of the main table. An even lift is ensured, and off-set loads can be rotated with ease. The revolving table is located on the main table by a nitrided steel pivot housed in a nitrided cast-iron bush. The balanced lift avoids binding, and enables a very fine clearance to be used between the pivot and the bush.

During cutting operations the revolving table is supported on the main table and clamped at all corners; this ensures maximum support to the workpiece and a minimum of table distortion or vibration. Accurate location of the revolving table is given by hardened and ground steel inserts at each 90 deg. position, and these engage with a hardened steel catch fitted in the centre tee-slot of the main table. Alternatively, the revolving table may be clamped to the main table in any position throughout 360 deg. As the lifting mechanism is an integral part of the revolving table, the whole unit may be lifted clear of the central location and repositioned on the main table to suit an individual work-piece. A special pivot can be supplied with a tongue-piece for locating and clamping in a tee-slot.

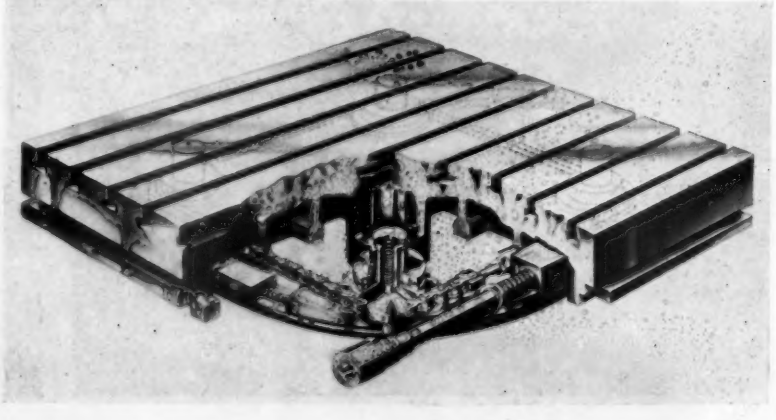
Further details may be obtained from H. W. Kearns & Co. Ltd., Broadheath, near Manchester.

Diesel Fuel-Injection System

THE Bicera Mk. II fuel-injection system is derived from the Mk. I system described in our October 7, 1960, issue, and is designed for small engines. One advantage is that it reduces the number of pipes per injector from four to two.

The system consists of a single servo-pump unit supplying the cylinder pump-injectors. The servo-pump contains a plunger operated by an eccentric on the driving shaft, which discharges fuel drawn from the fuel tank into a chamber at about 1,000 lb. per sq. in. This chamber, which is integral with the servo pump, is separated by a diaphragm from an air cell charged to a suitable pressure. Fuel from the chamber passes to a distributor rotor, driven through helical splines from the main shaft. Injection timing is varied by axial movement of the rotor shaft on the helical splines. A gap in the distributor periphery passes ports which are connected by feed pipes to the individual pump-injectors on the engine cylinders and allows high-pressure fuel to be fed to each in turn. The volume of fuel injected into the engine cylinders is regulated by an output-control valve in the distributor body.

The effect of the output-control valve is



to permit return flow from the pump-injector according to the setting chosen, and so to determine the amount of fuel to be retained below a spring-loaded plunger and piston in the pump-injector body. The next time high-pressure fuel from the servo-pump is fed to the individual pump-injector, the plunger is forced down and pumps the fuel below it to the nozzle, at a pressure equal to the servo pressure multiplied by the ratio of piston and plunger cross-sectional areas.

The system is claimed to assist in producing good combustion over a wide speed range without diesel knock. In rig tests, spray-impact diagrams have shown clean-cut injections up to a frequency of 3,000 per injector per min.

Further details may be obtained from the British Internal Combustion Engine Research Association, Buckingham Avenue, Slough, Bucks.

Industrial Storage Units

RAACO industrial storage cabinets have transparent, toughened-plastic drawers which are designed for the storage of small items and instruments. Each drawer has label holder and back stop, and is adjustable to smaller sections by sub-dividers.

The drawers are contained in a sheet-metal cabinet which can be stacked or fastened to a wall. In this way large compact storage installations can be built up.

Immediately available are three standard units 16⅜ in. high by 12¼ in. wide by 5¾ in. back to front. These can be supplied as a 36 A-drawer unit with drawer size of 1½ in. deep by 2⅜ in. wide by 5½ in. back to front; an 18 B-drawer unit with drawer size of 1½ in. deep by 5½ in. wide by 5½ in. back to front; and an 18 C-drawer unit with drawer size of 2⅜ in. deep by 3⅜ in. wide by 5½ in. back to front. These units are all priced at £6 2s. 3d. each.

Further details may be obtained from James H. Randall & Son, Ltd., Paddington Green Works, London, W.2.

High-Capacity Dumper

THE Whitlock D-D 70 Dinkum dumper is designed for the bulk handling of materials over ground which would be impassable for lorries, tractors, and trailers. It is built on the articulated-frame principle, and is capable of moving loads of 8 to 10 tons.

The body of the dumper is of pressed-steel plate with steel-channel re-inforcing, and is shaped to permit ease of loading, and complete discharge of materials of varying densities. Tipping of the body is effected by twin hydraulic ramp, double-acting to ensure a quick return to the horizontal position.

Control of the vehicle is facilitated by the hydraulic steering system, comprising four double-acting rams coupled to a valve-control box, and a large output hydraulic circuit, incorporating pump, fluid reservoir, full-flow filters, and overload relief valve. A steering lock of 180 deg. is obtainable, and the turning circle is 13 ft. radius at full lock.

The power unit consists of a four-cylinder diesel engine, developing a maximum output of 51·8 b.h.p. at 1,600 r.p.m. The transmission is through a Borg & Beck heavy-duty clutch, and a gearbox giving six forward speeds and two reverse speeds. The maximum forward speed is 13·16 m.p.h. Foot-operated internal-expanding brakes are fitted to all four wheels, actuated by mechanical linkage at the front and servo-vacuum at the rear. The cab, which gives full all-round vision, is of toughened glass fibre.

The overall length is 24 ft. 8 in., the width 7 ft. 9 in., and the maximum height 8 ft. The capacity of the body is 7 cu. yd., and the angle of tip 65 deg. The electrical system, including engine starting, is 12 V.

Further details may be obtained from Whitlock Bros. Ltd., Great Yeldham, Essex.

Excavator and Power Shovel

THE Whitlock Dinkum 60 excavator is designed for a variety of operations, including mass-excavation, square-hole digging, excavation for building foundations, land stripping, trench work, and dyke cleaning.

All digging, lifting, and discharging movements are executed by hydraulic rams, deriving their power from a vane-type pump, which runs below its rated capacity to give full power at a constant low working pressure. The rams, which are located above the main jib for protection from damage, are fitted with universal joints to give constant self-alignment and reduce wear on seals and bearings. Large-diameter pins, bearings and replaceable bushes are used at all shock points. Short high-pressure hoses with banjo couplings are incorporated in the hydraulic system at all moving points.

Hydraulically-operated retractable stabilisers, mounted on each side of the vehicle, can be adjusted up to a maximum spread of 13 ft. 6 in., enabling the machine to be levelled up on uneven ground, and permitting digging operations close up to walls.

A large number of attachments is available to suit particular requirements. The power grab can be forced by hydraulic ram down into the material to be excavated, and is designed for various types of excavation, including the digging of square holes. On large excavations it is capable of operating down to 16 ft. below ground level. The grab can be rotated through 360 deg., and be locked in position as required to allow either longitudinal or traverse digging.

The power unit consists of a four-cylinder 51·8-b.h.p. diesel engine driving through a clutch and six-speed gearbox, the arrangement being similar to that adopted for the dumper described elsewhere on this page.

The chassis is of heavy pressed-steel frame construction, and the cab is of pressed steel with glass-fibre roof, and sliding doors and windows. Cab equipment includes a pressure gauge and thermometer connected to the hydraulic system. The machine also may be mounted on a floating craft to form a dredger for canal work.

The Whitlock 66 power shovel incorporates the same chassis and power unit as the Dinkum 60 excavator, and is similarly operated by hydraulic rams. In addition to the shovel, other attachments can be fitted, as required, enabling the machine to be used for high-level maintenance purposes, as a crane, as a roller, or as a high-lift loader.

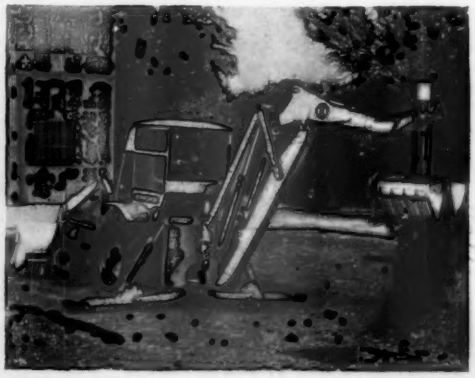
Further details may be obtained from Whitlock Bros. Ltd., Great Yeldham, Essex.

Packaging Material

CREPED Waxed Kraft is a completely waterproof paper particularly suitable for use as an inner wrap for odd-shaped engineering components; even those with sharp corners. Quick and efficient use is ensured because the material is self-adhesive and can be stretched and moulded easily to almost any shape.

Price per 100-yd. roll, 40-in. wide, is £3 12s. with reductions for quantities. Delivery can be made by return.

Further details may be obtained from Leonard Stace Limited, Gloucester Road, Cheltenham, Glos.



Re-organisation of the Nationalised Transport Undertakings

Containing the Government's proposals for the re-organisation of the British Transport Commission

The Government's proposals for the future structure, working, and financial re-organisation of the nationalised transport undertakings were given under seven main headings: the Government's aim; the problem; the Government's main conclusions; the Government's proposals; finance and related matters; commercial freedom, and legislation.

The Government's Aim

The nationalised transport undertakings were to be soundly based both in organisation and finance, providing efficient service to industry and the public and giving a good livelihood and worthwhile jobs to those who work in them. Sweeping changes would be needed to reduce the present rate of annual deficit—about £100 million—which would have produced a total of about £500 million by the end of this year. The public must face changes in the extent, nature, and price of services provided: the taxpayer must face a major capital re-organisation and a continuing heavy burden until the railways are on their feet, and railway employees must increase productivity and co-operate to ensure maximum efficiency.

The Problem

The railways were a great national enterprise and a vital basic industry. They employed half a million people and represented an investment of nearly £1,600 million, which was growing by more than £100 million each year. A railway system of the right size was an essential element in our transport network and would remain so for as long as could be foreseen. The railways were a long way short (by about £60 million a year) of covering even their running costs. This was quite apart from the problem of meeting their interest charges, whether on the price paid for the undertakings or on the money since borrowed for modernisation and other purposes. These interest charges now totalled some £75 million a year. The practical test was how far users were prepared to pay economic prices for services provided. Broadly, this would settle the size and pattern of the railway system, which must be made more compact. There must also be modernisation, not only of layout, equipment, and operating methods, but of organisation and management structure. The Government was convinced that, as an essential first step, there must be radical changes in the organisation, financial structure, and statutory framework of the undertakings controlled by the British Transport Commission.

The present size and diversity of the Commission's activities made its effective operation as a single undertaking virtually impossible. The size and difficulties of British Railways had understandably tended to preoccupy the Commission and had affected its outlook over the whole range of its activities. Financially and commercially, there had been a tendency for technical and operating factors to prevail: there had also been a confusion between what was economically right and what was socially desirable. Railway commercial capability was circumscribed by out-moded statutory obligations and restrictions. Mounting deficits presented a situation detrimental to the morale of management and men, financial control, and hopes of recovery.

The Government had therefore decided to replace the Commission and existing organisation by a new structure; to reconstruct the finances of the Commission and in particular of the railways, and to give to the various undertakings the maximum practicable freedom of operation in their commercial affairs.

A New Structure

Each main activity of the Commission was to be managed by its own board with its own assets and responsible for its own capital debt. This should provide each board and management with a clearly-defined task. The boards for British Railways, London Transport, British Transport Docks and British Waterways would be incorporated under statute and responsible direct to the Minister of Transport, who would appoint their members. All other activities would be grouped under a holding company.

The British Railways Board would be responsible for running the railways as an effective national system and be vested with the railway assets (including the railway workshops) and the responsibility for the capital debt of the railways as a whole. The board would perform only those central functions essential to running the railways as a single entity; all other functions would be the responsibility of the Regional Railway Boards, described below. The British Railways Board would be responsible for such matters as national staff and wage negotiations, overall control over finance and investment, policies for safety, training, and research, and determination of the size and shape of the railway system. It would comprise a Chairman and Vice-Chairman, a representative from each Regional Railway Board, certain full-time members with special responsibilities, and one or two part-time members.

Regional Railway Boards

The Regional Railway Boards, replacing the present Area Boards, would be responsible for the management and operation of their regional railway systems. Each would be autonomous in all matters which concerned its region alone, and each would maintain a regional trading account, possible bases for which had been suggested by the Commission's consultants. Membership, most of which would be full-time, would be limited and include each Regional General Manager.

The packet ports and those shipping services which were extensions of the railway system would continue to be treated as part of the railway system.

London Transport

The London Transport Executive would be called the London Transport Board and would continue to comprise mainly full-time members of whom a number would have special responsibilities. It would be responsible for the public transport monopoly at present delegated to the London Transport Executive. As hitherto, it would work in close concert with the London lines of British Railways in all matters of common concern.

The ports and docks now administered by British Transport Docks Division would be transferred to a new statutory Docks Board, membership of which would be limited. The management of the more important of its ports would be represented on the board.

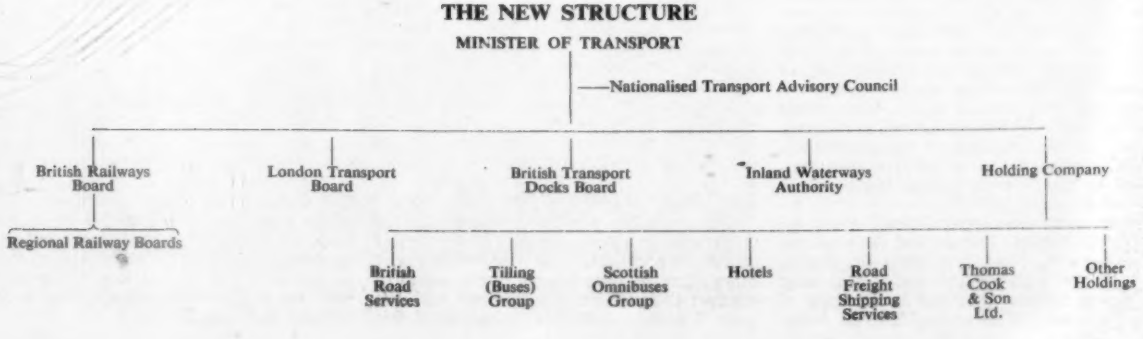
British Transport Waterways would come under an independent statutory board known as the Inland Waterway Authority, which would own and manage the nationalised inland waterway system. It would also redevelop or dispose of waterways which no longer had a transport use. Its composition, powers, and duties would be further discussed.

British Road Services, the Tilling (Buses) Group, the Scottish Omnibuses Group, British Transport Hotels—railway catering services would be the responsibility of the railways—Road Freight Shipping Services and Thos. Cook & Son Ltd., would each be operated as companies incorporated under the Companies Act with their own boards. The holding company would be responsible to the Minister, who would appoint its board.

Minority Shareholdings

Minority shareholdings held by the Commission in certain transport concerns would be transferred to the holding company. The Commission's holdings in certain companies either controlled by the Commission or in which the Commission held a minority interest, the activities of which were essentially connected with the railways, would be transferred to the British Railways Board.

One or more organisations specially equipped to advise on the development of the Commission's freehold and leasehold



property would be set up.

Assisted by an advisory body, the Nationalised Transport Advisory Council, the Minister of Transport would assume responsibility for co-ordination of policy between the new boards and would allocate funds for new investment. Suitable arrangements also would be established for co-ordinating the day-to-day activities of individual undertakings, including that of road and rail. The new organisation was not proposed to extend the Minister's existing statutory powers and responsibilities in relation to the nationalised transport industries, but to provide for direct contact between him and the main component parts of the industry.

Minister as Chairman

The Nationalised Transport Advisory Council's main responsibility would be to advise the Minister on the co-ordination of the nationalised transport undertakings and questions of policy. It would have no executive functions. It would comprise the Chairman of the boards of British Railways, London Transport, British Transport Docks, the Inland Waterways Authority, and the holding company. Other members drawn from outside the nationalised transport undertakings would be added. The Minister would ordinarily act as its Chairman.

The Chairmen of the five major boards would be appointed by the Minister. The members of each board would be appointed by the Minister after consultation with the respective Chairman. Certain other appointments would be subject to the Minister's approval. Use would be made of the experience of the trade unions. Promotion from within would be facilitated, although at the outset some major positions might have to be filled from outside the transport structure.

Finance and Related Matters

The financial situation of the Commission and the railways was so serious that they could not now carry on without substantial support from the Exchequer and a drastic scaling-down of debt was necessary to give the railways a fresh start. An interim financial reconstruction would be introduced to cover the next five years.

The net capital liabilities of the Commission at December 31, 1959, amounted to approximately £2,000 million, of which £1,400 million consisted of British Transport Stock and £600 million of advances from the Minister of Transport. It was with these liabilities that the proposed reconstruction was primarily concerned.

Non-Railway Capital Liabilities

Some £400 million of the £2,000 million capital liabilities was attributable to the non-railway activities which in the main had been self-supporting. Responsibility for this amount would in effect be transferred to the new board. The balance, some £1,600 million, related to the railways. Of this, about £400 million was attributable to losses which had accumulated in recent years, and had been financed mainly by Exchequer advances. In the Government's view, there was no prospect of these losses ever being recovered, and it was proposed to write off this amount. Of the £1,200 million of capital liabilities which would remain, the Government proposed that about £400 million (equivalent to the written-down book value of the railways' investment since modernisation began in 1955) should continue to rank as an interest-bearing loan on normal terms.

The remainder (£800 million) would be placed to suspense account and carry neither fixed interest nor fixed repayment obligations. The amount and treatment of this account would be subject to review in the light of developments and in particular of an examination of the book value of assets acquired up to and including 1955. Amounts might have to be written off in respect of ascertained capital losses (including losses in respect of assets which became obsolete as modernisation proceeded). The existence of the suspense account would enable the Exchequer to obtain some return if railway finances improved.

The Treasury would assume responsibility for existing British Transport stock, and the rights of stockholders would be fully safeguarded. At the same time, appropriate amounts of debt to the Exchequer would be assumed by the new boards.

The effect of these proposals would be to remove from the railways (*a*) the whole burden of accumulated losses, and (*b*) the greater part of the liability relating to their capital value before the beginning of modernisation in 1955, except in so far as, at a later date, the undertaking might be able to resume the burden. Though removed from the railways, these heavy liabilities would still exist. They would only have been transferred to the public in another form for they would fall on the Exchequer.

Reduced Annual Interest

Though immediately relieved of over £40 million annual interest, the railways would still have to pay interest on (a) the reduced capital liability of £400 million; (b) certain other liabilities, i.e., superannuation funds and savings bank deposits, and (c) new borrowings for capital expenditure. At the end of the next five years, the total charge under these three heads might amount to some £60-£70 million a year, depending on the level of new borrowings and the rate of interest.

To help the railways to eliminate their operating loss, now running at about £60 million a year, and to meet out of their own revenues the interest charges referred to above, the Government would keep the financial position of the railways under close review and would make a special review of the position at the end of the five years. In consultation with the railway administration, the Government would establish targets of financial performance to be achieved from year to year over the five-year period.

Interim Period

Large sums would continue to be required from the Exchequer during the interim period to meet railway deficits, including interest; and the necessary Government powers would be sought. Increases in railway fares and charges would make their due contribution toward meeting railway costs.

Efficiency of operation and the most economic use of manpower were crucial. Work study should be extended far beyond the 6 per cent of railway staff so far covered. This had already been considered by the British Railways Productivity Council and both sides of the industry had made a joint appeal for co-operation by all concerned.

Uneconomic Services

The Government would consider the suggestion of the Select Committee on Nationalised Industries that uneconomic services required from the railways on grounds of national interest or social need should be met by specific grant from public funds. Meanwhile, railway losses of this kind would in practice be covered by the contributions proposed from public funds.

Financial Duties of other Boards

The foregoing special arrangements for the remission of debt and the writing-off of liability applied only to the railways. The other statutory boards would be expected to conduct their affairs in accordance with the general system applicable to boards of this character, that is, to balance their accounts, taking one year with another. Special aid might have to be given in the initial years to the Inland Waterways Authority.

The holding company was in a different category, for it would hold shares in businesses which were operating in the same field as private enterprise. These businesses, like similar businesses in the private sector, might be expected to yield a good return. Subject to regulations which affected private as well as public businesses of these kinds, it would be the duty of the holding company to secure the best possible results for the public purse. The profits of the holding company would accrue to the Exchequer in the form of dividends and should be some offset to losses on other nationalised transport undertakings.

Other Financial Matters

The Government did not propose any relief from certain liabilities including those in respect of superannuation funds and savings bank deposits amounting to about £280 million as at December 31, 1959, and mainly attributable to the railways. Changes in the present arrangements were under consideration, but these changes would not affect the security of the deposits and the rights of the beneficiaries, which would continue unimpaired. Consideration also was being given to the scale of depreciation and obsolescence provisions which should be made by the various undertakings.

Commercial Freedom

The railways would be freed from statutory control over charges, except for fares in the London Passenger Transport Area, where the London Transport Executive and British Railways had a virtual monopoly of public passenger transport. This change would substantially reduce the functions of the Transport Tribunal.

Freehold and Leasehold Property

The present statutory restrictions on the development of property by the nationalised transport undertakings would be suitably relaxed. The Commission already had power to accommodate, by way of leases, pipelines on its property. Subject to any general legislation on pipelines which the Government might wish to promote, it was proposed to give certain of the new undertakings, particularly the railways, powers to lease, provide, and operate pipelines on their own property. Existing provisions protecting coastal shipping from competition from inland transport were being examined by the Government in the light of the need to give greater commercial freedom to the railways and of the interest of the coastal shipping industry.

Legislation

The Government's proposals for the new structure, for financial reconstruction, and for freedom of commercial operation would require major legislation, Consultations and preparations would take some time to complete. The Government proposed to introduce the necessary Bill in the next Session of Parliament. Should interim legislation be required, it would be introduced.

Conclusion

H.M. Government had sought to find practical answers to the difficulties with which the nationalised transport undertakings were confronted. The Government had been guided solely by its concern to establish what was best for the country and best for the undertakings. It put these proposals forward as providing the best opportunity for the various undertakings, and especially the railways, to become efficient and soundly based.

"Trans-Pennine" Diesel Train Services

Accelerated timings and more frequent trains mostly using new Swindon-built multiple-unit diesel stock

On January 2, 1961, British Railways, North Eastern Region, in conjunction with the London Midland Region, will launch its inter-city diesel multiple-unit passenger service, to be called the "Trans-Pennine," between Hull and Liverpool. At the same time an improved passenger service will be introduced between Newcastle and Liverpool operated by 2,000-h.p. diesel locomotives.

All services are to be greatly accelerated. Important parts of the Trans-Pennine route, for instance, will have regular interval, half-hourly, or hourly fast trains. Connections, too, will be greatly improved, and the emphasis will be on comfort as well as speed and reliability.

Specially-designed Stock

The new trains, all equipped with griddle buffet cars, have been specially designed and built at Swindon, British Railways, Western Region, to the same standards of strength and comfort as main-line locomotive-drawn coaches. A detailed description appeared in our August 12, 1960, issue. The route is one of the most exacting in this country as far as the maintenance of good train performance is concerned.

The routes concerned are:—

Hull-Liverpool

The former steam services will be scrapped, and there will be five through express diesel services in each direction every weekday. The new services will reduce by an average of 45 min. the present three-and-a-half-hr. journey time, with a corresponding speed-up at intermediate stages. The biggest acceleration, compared with present timings will be 67 min. In addition, improved connections will be provided at Leeds.

The new service will mean that the Hull businessman, for instance, will be able to leave his office at about 9.0 a.m., catch the 9.13 a.m. train, lunch with his associates in Manchester, attend a two-hr. meeting, return by the 4.40 p.m. from Manchester, have tea on the train, and get back to Hull at 6.58 p.m., in reasonably good time for a normal evening meal at home.

Leeds-Manchester-Liverpool

The main impact of the new "Trans-Pennine" service will be felt on the Leeds-Manchester-Liverpool route, where an hourly interval service will be provided. Express trains will leave Leeds for Liverpool at 45-min. past the hour from 7.45 a.m. until 7.45 p.m. (except 9.45 a.m. to Manchester only). An additional train will leave Leeds at 10.18 a.m. for Liverpool, and also there will be additional trains to Manchester at 8 a.m. and 9.15 a.m. In the reverse direction express trains will leave Liverpool for Leeds at 7.50 a.m., and hourly from 9.0 a.m. until 7 p.m.

Newcastle-Liverpool

At present there are three steam-hauled trains in each direction between Liverpool Lime Street and Newcastle, and one between Liverpool Exchange and Newcastle. These will be replaced by four new improved diesel-hauled trains between Newcastle and Liverpool Lime Street. The steam-hauled service between Liverpool Exchange and Newcastle will run only to and from York, but with connecting services forward. To reduce the present overall journey times some stops have been deleted, and new feeder services will be introduced. Accelerations varying from 25 to 83 min. will be achieved on today's comparable trains.

The Newcastle businessman will be able to leave his office at about 8.30 a.m., catch the 8.45 train, arrive in Liverpool at 12.51 p.m., do an afternoon's business there, and travel back on the 5.5 p.m., due back in Newcastle at 9.24 p.m., having had all meals on the train. Similarly, the Liverpool businessman can catch the 9.0 a.m. through train to Newcastle, spend the afternoon there, returing by the 4.47 p.m. from Newcastle, due back at Liverpool at 8.51 p.m.

Local Services

There will be an hourly diesel stopping service between Leeds and Huddersfield which, with the fast service, will provide half-hourly services between these points throughout most of the day. Also a two-hourly stopping service will operate between Huddersfield and Manchester, and an hourly diesel stopping service between Liverpool and Manchester *via* Tyldesley will give improved connections out of the new inter-city service.

In addition there will be better connections from the North East to Stoke, Crewe, Birmingham, the West of England, and South Wales, *via* an improved diesel service between Stalybridge and Stockport.

One of the six-car inter-city trains built at Swindon with British United Traction Limited under-floor diesel power

Improved connecting services from York and other places not on the direct Trans-Pennine route are an integral part of the new service. For instance, from York the scheme includes an additional train to Leeds leaving York at 9.25 a.m. connecting with the 10.18 a.m. Trans-Pennine train at Leeds, and arriving in Liverpool at 12.6 p.m.

About 15 min. will be saved on the average journey time even between Leeds and Manchester, and about 12 min. between Huddersfield and Manchester. Between Leeds and Liverpool the average saving will be 27 min.

The special rolling stock includes 34 power cars with British United Traction equipment, and 17 trailers; these figures include spare cars. Normally trains will be formed of six cars, each unit consisting of four powered cars with two intermediate trailers. With a power-weight ratio of 8·1 b.h.p. per ton and a maximum speed of 70 m.p.h. the new trains have better than average acceleration combined with the capacity to deal easily with the severe gradients on the route. Each set has seating accommodation for 60 first class passengers and 232 second class.

Inaugural Runs

A series of inaugural runs was planned to be held yesterday (Thursday) on the following sections of the Trans-Pennine route: Liverpool to Manchester Exchange and back; Manchester Exchange to Leeds City and back; Leeds City to Manchester Exchange and back; Hull to Leeds City and back.

The Lord Mayors of Hull, Leeds, Liverpool, and Manchester were invited as principal guests to undertake the inauguration ceremonies and travel on the trains. In addition, mayors of townships on the route, other holders of civic office, Members of Parliament, and prominent representatives of business, industrial and commercial interests were invited to take part.

Electric Services in East Kent

The first electric trains are to come into service on the Kent Coast between Dover and Ramsgate, British Railways, Southern Region, on January 2, some 18 months ahead of schedule.

This is part of the line being electrified under Phase Two of the Kent electrification scheme, the route from Sevenoaks to Ramsgate via Ashford and Dover and its branches between Paddock Wood and Maidstone West, Maidstone East and Ashford, Ashford and Minster and Folkestone Harbour. Electric trains have been running on the other main line to Dover (via Chatham) for nearly 18 months, and have brought a spectacular increase in passengers. Target date for similar services, regular-interval multiple-unit expresses, in this second phase is June, 1962, but as engineers have already completed one section of the electrification work, it has been decided to start replacing steam trains on the Dover-Minster-Ramsgate stretch on January 2. They will run to existing schedules.

It is likely that as further stretches of line are electrified so more electric trains will take over from the existing steam and diesel services. Electrifying the 45 miles of track between Dover, Minster and Ramsgate took about 14 months. Work started in August, 1959, and the first test trains began running at the end of October this year. The engineers were able to complete their work in this time because they did not face major engineering problems on the same scale as in the first phase of the Kent electrification. Forty-five miles of conductor rail have been installed and 21 miles of trough-

ing laid for high-voltage and pilot cables.

Five sub-stations and six paralleling huts have been constructed. Engineering work at four stations, Minster, Sandwich, Walmer and Martin Mill, is being undertaken to enable eight-car trains to be dealt with. At Deal station a disused refreshment room on the up platform is being converted to a staff room.

British Railways Exhibit at Electrical Engineers' Exhibition

At the tenth Electrical Engineers' Exhibition to be held at Earls Court, London, from March 21 to March 25, British Railways will show, by models and by actual equipment, many recent developments in the electrical engineering aspects of railway modernisation.

The exhibition will include a model of the latest overhead equipment, with actual signal-cabin controls installed to operate signalling and trackside electrical equipment, the cabin being built alongside a station platform complete with standard track. The platform will be used to demonstrate the latest types of station illumination, lighting standards and signs.

Emphasis also will be given to research programmes on signalling relays, recorders for movement information, control equipment for electrical power supply, and many other features concerning communications.

In adjoining display rooms, manufacturers in this field will show their latest equipment.

E.A.R. & H. Engineers' Conference

The illustration below shows a group of members of the staff of the Chief Mechanical Engineers' Department, East African Railways & Harbours Administration, photographed for the 1961 Conference of District Officers.

Standing left to right: Messrs. T. G. Jacobs, Acting Administrative Assistant, Headquarters; E. Cowley, Acting Works Manager, Dar es Salaam; F. W. Goundry, District Motive Power Superintendent, Kampala; D. M. S. Fairweather, District Mechanical Engineer (Design), Headquarters; D. E. Templer, Acting District Motive Power Superintendent, Tabora; E. Horner, Assistant Mechanical Engineer (Seconded to General Manager); R. C. Jackson, Assistant Mechanical Engineer, Southern Province Railway, Mtwara; J. E. Fuller, District Mechanical Engineer, Tanga; J. W. Lee, District Motive Power Superintendent, Nakuru; P. D. Swan, District Motive Power Superintendent (Carriage & Wagon), Headquarters; J. Stewart, District Mechanical Engineer (Research & Economy), Headquarters; F. Jones, District Motive Power Superintendent, Nairobi; C. L. Mullen, Acting Works Accountant, Headquarters.

Sitting left to right: Messrs. J. G. Grant Electrical Engineer, Headquarters; R. M. Davies, Senior Mechanical Engineer (Motive Power), Headquarters; A. Towle, District Mechanical Engineer, Dar es Salaam; H. B. Marshall, Assistant Chief Mechanical Engineer (Motive Power), Headquarters; J. Hudson, Chief Mechanical Engineer, Headquarters; W. E. Bulman, Assistant Chief Mechanical Engineer (Technical), Headquarters; N. F. Stevens, Assistant Chief Mechanical Engineer (Workshops), Headquarters; A. G. Cowley, Works Manager, Nairobi; S. G. Hudson, District Mechanical Engineer, Dar es Salaam.

Reorganisation of B.T.C.

The British Transport Commission has taken note of the Government's plans for the reorganisation of its undertaking. It does not feel that it would be appropriate to make any comment on these plans. The Government has informed the Commission that legislation to amend the present Transport Act cannot be passed until the next session of Parliament, until when the Commission will remain responsible for the affairs of the undertaking. The Government has sought the co-operation of the Commission in promoting the implementation of its plans so far as this can be done in the meantime.

In assuring the Government of its readiness to do this the Commission has been actuated by a desire to do everything possible to restore confidence and clarity about the future throughout the organisation. It will be its endeavour, within present statutory limits, to arrange that the men who are to occupy the key positions in the new organisation are given the status, authority and machinery necessary to enable them to exercise the responsibilities of those positions as soon as possible. The Commission believes that in this way it can best take care of the interests of the undertaking and of those who use its services.

Personal Statement by Sir Brian Robertson

The following statement is made on behalf of Sir Brian Robertson, Chairman of the British Transport Commission:—

"My post will disappear when the new organisation comes into effect. Meanwhile I have agreed to play my part within the terms of the statement put out on behalf of the Commission."

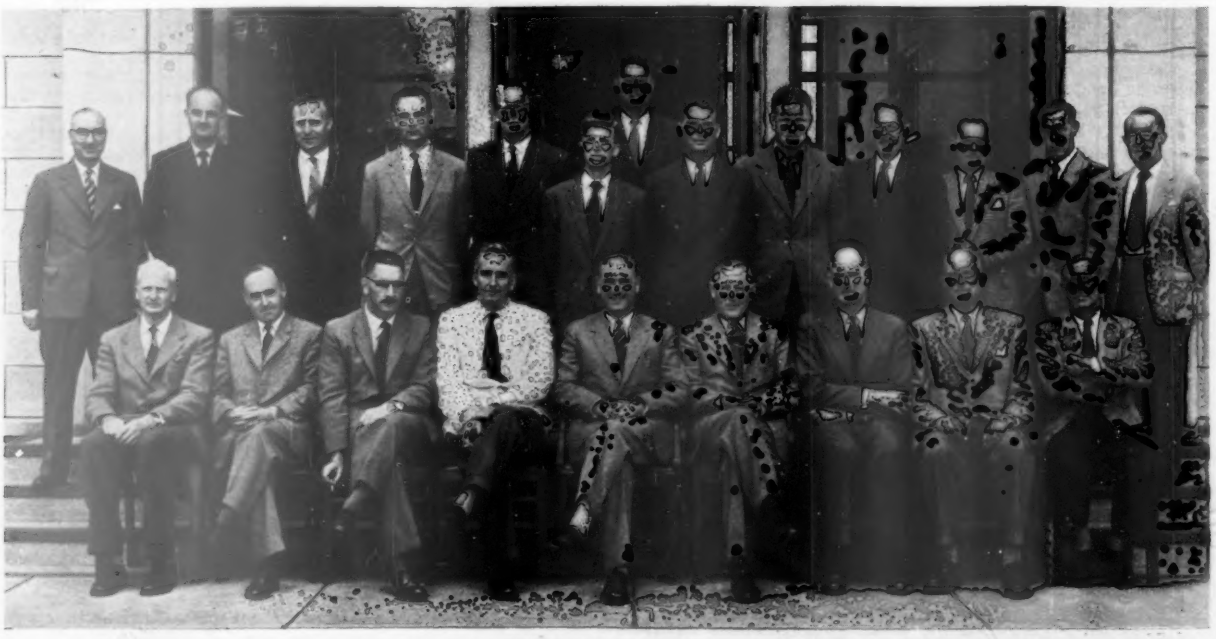
Questions in Parliament

Electrified Services Inquiry

Mr. G. R. Strauss (Vauxhall—Lab.) asked the Minister of Transport on December 19 whether, following the explosion and fire which has led to the withdrawal from service of Scottish electric trains, he would initiate an immediate investigation into new electric rolling-stock in other Regions as a safeguard against similar occurrences.

Mr. Ernest Marples: An inquiry is being undertaken into the explosions which have led to the withdrawal of the Glasgow suburban electric services. I am discussing with the Commission whether a wider investigation is needed.

Mr. Strauss: Will the Minister state categorically that British Railways can be in no way held responsible for the faults which



Officers attending the conference of the Chief Mechanical Engineer, East African Railways & Harbours

have occurred in the transformers, Will he give an assurance that this setback will not be used as an excuse for holding up any of the electrification schemes in the modernisation plan ?

Mr. Marples: I do not think it right to prejudge the issue of an independent investigation. I advise hon. Members to await the result of the investigation. In answer to the second part of the right hon. Gentleman's supplementary, I do not think that one would allow this incident to prejudice one unduly against modernisation.

Withdrawal of Glasgow Suburban Electric Stock

Technical officers of the British Transport Commission and of the Eastern and London Midland Regions of British Railways which also use a.c. electrification met on December 18 with technical representatives of all the manufacturers concerned in the supply of electrical equipment for the trains of the Scottish, London Midland and Eastern Regions.

The circumstances which called for the temporary suspension of the Glasgow electric stock were discussed in detail and a testing programme, designed to ascertain the causes and the cure for the Glasgow problem, was agreed and has been put in hand. It was decided to bring in the B.T.C. panel of consulting engineers to assist in solving the problem of the transformer breakdowns so as to augment the testing staffs available and effect a cure to the trouble at the earliest possible moment.

Definite Assurance Given

The whole problem was discussed in the light of a possible extension of the trouble to other regions and a definite assurance has been given that it is confined solely to the equipment used in Scotland. It is in no way associated with any previous incident on any of the other Regions and their stock can continue to be used in complete safety. Brigadier C. A. Langley, Chief Inspecting Officer of Railways, Ministry of Transport, was present throughout the discussions.

Contracts and Tenders

Ferrostaal A. G., Essen, has received a contract from the Hellenic State Railways for the supply of 10 three-car diesel units. Construction will be carried out by Maschinenfabrik Esslingen. The trains will have 1,600 h.p. Maybach engine equipment. Ferrostaal A.G. and Maschinenfabrik Esslingen supplied, in 1959, seven three-car diesel units with trailers to Greece for the Peloponnesus Railway.

British Railways, Scottish Region, has placed a contract with Kinnear Moodie & Co. Ltd. of Glasgow for the reconstruction of part of pier, Stranraer Harbour.

The Toronto Transit Commission has awarded the contract for the signal system for the University Section of the Bloor-Danforth-University Subway to the General Railway Signal Company of Canada, at a total price of $978,751. The contract covers the supply and installation of all-electric block signalling equipment for 12,000 ft. of subway on the University line extending from Front Street to Huron Street. It includes interlocking equipment in the St. George Station area and between St. Andrew and Union Stations, both of which interlocking areas will be operated from a central control panel at St. George Station. Also included in the contract is the modification and removal of certain existing Yonge Subway signal equipment, and the consolidation of present interlocking signals with the interlocking signals for the new line.

The Export Services Branch, Board of Trade, has received calls for tenders as follow :—

From Pakistan :

18 axles steel couple driving P. & R. class finished

76 axles steel tender P. & R. class finished.

The issuing authority is the Chief Controller of Stores, Eastern Bengal Railway, Pahartali, Chittagong, to whom bids should be sent. The tender No. is P6/EA1/MG/44/60/ATW/ACST. The closing date is January 18, 1961. The Board of Trade reference is ESB/32839/60. While it is not essential for tenderers to have local representation in Pakistan, it is considered desirable.

46 axles steel MAWD class, suitable for hind truck

3 axles steel bogie front truck MAWD class rough.

The issuing authority is the Chief Controller of Stores, Eastern Bengal Railway, Pahartali, Chittagong, to whom bids should be sent. The tender No. is P6/EA1/MG/42/60/ACST/ATW. The closing date is January 18, 1961. The Board of Trade reference is ESB/32838/60.

126 tyres steel tender CWD

40 tyres steel engine front truck for CWD

26 tyres steel hind truck.

The issuing authority is the Chief Controller of Stores, Eastern Bengal Railway, Pahartali, Chittagong, to whom bids should be sent. The tender No. is P6/EA1/BG/22/60/ATW/ACST. The closing date is January 18, 1961. The Board of Trade reference is ESB/32837/60.

14 steel axles for steam locomotives

975 steel tyres for steam locomotives.

The issuing authority is the Chief Controller of Stores, North Western Railway, Empress Road, Lahore, to whom bids should be sent. The tender No. is 210-S/1-PT XII. (PIL). The closing date is January 17, 1961. The Board of Trade reference is ESB/32363/60.

From Chile :

5 electric rail vans for servicing the overhead power lines on the Santiago-Chillán sector of 1·676 m. gauge.

The issuing authority is the Empresa de los Ferrocarriles del Estado, Depto. Traccion y Maestranzas, Avda. Bernardo O'Higgins, Esq., Serrano, Casilla 2017, Santiago, to whom bids should be sent. The closing date is January 10, 1961. The Board of Trade reference is ESB/32860/60.

From Egypt:

15,000 *tonnes* of flat-bottom rails 52 kg.

The issuing authority is the Purchases & Stores Department, Railways Building, Shoubra Subway, Cairo, to whom bids should be sent. The tender No. is ER. 302.G.3/145. The closing date is January 14, 1961. The Board of Trade reference is ESB/32400/60. No further information regarding this call for tender is available at the Board of Trade.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

Notes and News

B.I.C.C. Group Reorganisation.—British Insulated Callender's Cables Limited is to transfer the manufacture of plastic cable and associated products from Telcon Works, Greenwich, to other factories of the group. Production at Greenwich will henceforth be exclusively submarine cables and marine engineering products. It is expected that these arrangements will become fully effective by the end of next year and will involve some redundancy at the factory.

Guest Keen & Nettlefolds Limited Ordinary Shares.—Guest, Keen & Nettlefolds Limited, announce that of the 6,582,011 ordinary shares offered to ordinary stockholders of the company at 70s. a share acceptances have been received in respect of approximately 97 per cent. The balance not taken up, amounting to 185,241 new ordinary shares, has been sold for the benefit of the ordinary stockholders to whom new shares were provisionally allotted.

Engineers' Conference.—Viscount Chandos, Chairman of Associated Electrical Industries Limited, will be one of the principal speakers at a one-day conference which has been organised for March 22 by the Engineers' Guild. The theme of the conference will be "The Professional Engineer—His Employment and Development." The Chairman will be Sir Hugh Beaver, President of the Guild. This conference is intended for managers, personnel officers and professional engineers and will be held at the Connaught Rooms, Great Queen Street, London, W.C.

New Bus Timetables.—As an experiment, London Transport has brought out for sale to the public, area timetables for its country bus and Green Line services. Until now, published for the use of bus officials only, the timetables are available in five books covering north, north-east, north-west, south-west, south and south-east areas. They can be bought for 2s. each at London Transport bus garages and local enquiry offices in the country area. They will not replace existing local road-and-rail timetables.

Information for the British Exporter.—A second edition of the coloured wall map, "Information for the British Exporter," has been prepared for the Board of Trade by the Central Office of Information. The map pinpoints every United Kingdom commercial post throughout the world, gives U.K. export and import figures for many individual countries and the proportion of the United Kingdom contribution to their total imports. The sterling, dollar, E.F.T.A., and O.E.E.C. areas are indicated, and a list of national currency units and values is given. The map is being distributed free to U.K. firms. All inquiries should be addressed to Regional Controllers of the Board of Trade (see *Board of Trade Journal* of November 18, 1960, page 1,258, for addresses).

Firth Cleveland Group forms American Marketing Subsidiary.—Firth Cleveland Steels Incorporated, with offices at 230, Park Avenue, New York, 17, N.Y., U.S.A., has been formed by the Firth Cleveland Group. The new company will act as selling agent in the United States for all the companies in the Steels Division of Firth Cleveland : Firth Cleveland Steel Limited, Richard Hill Limited, Richard Hill Rolling Mills Limited, the Firth Company Limited, the Sheffield Wire Rope Co., Ltd., and Keeton, Sons & Co., Ltd. Firth Cleveland Steel Limited also is a newly-formed company with overall responsibility for the U.K. and export sales of the steel strip produced by

J. J. Habershon & Sons Ltd., the Tenuous Steel Co. Ltd., Firth Cleveland Steel Strip Limited, and Edmonton Steel Strip Limited. Mr. Charles W. Hayward, Chairman of Firth Cleveland Limited, is President of Firth Cleveland Steels Incorporated. Mr. J. W. Tonking, Managing Director of Firth Cleveland Steel Limited, is Director and Vice-President. The products to be handled include hot and cold-rolled, mild-, medium-, and high-carbon and stainless qualities of steel strip, hardened and tempered steel strip, wire rod, wire and wire products, steel reinforcement and mesh, and hollow-bored steel bars.

Zagreb International Autumn Trade Fair.—The Board of Trade, through its Publicity & Overseas Fairs Branch, in conjunction with the official agents, Empson & Turner Limited, has made arrangements for the British section of the Zagreb Autumn Fair in September, 1961. Some 8,000 sq. ft. of pavilion space and 3,000 sq. ft. of outdoor space have been reserved provisionally and British firms interested in participating are being invited now to apply for sites. The cost, including shellstand floor space in the pavilion is £7 per sq. m. (£4 6s. for floor space and £2 14s. for shell-stand) and outdoor space is £2 3s. per sq. m.

Train Hits Van: Seven Dead.—Six men and a woman were killed and two men injured late on October 17 when a motor-van in which seven of them were travelling crashed through a bridge parapet on the railway line at Pyle, Glamorgan, and was hit by a goods train. The accident occurred in thick fog, which hampered rescue operations lasting five hours. A man passing the spot in his car saw the van plunge through the bridge. He stopped, clambered down the railway embankment and was assisting the injured occupants of the van when the train emerged from the fog and ploughed into it, killing him and the other six people. The van was carried a quarter of a mile along the track before the train came to a stop. Pyle railway station was closed to the public and turned into an emergency casualty clearing station. Rail traffic was stopped until about 4 a.m. yesterday when the line was cleared.

Oldham & Son Ltd. Interim.—Oldham & Son, Ltd., is repeating its interim at 7½ per cent for the year to March 31, 1961, an effective increase of 2½ per cent adjusting for a one-for-two scrip issue. A total of 17½ per cent has been foreshadowed. The 1959-60 final was equivalent to 6⅔ per cent.

International Computers & Tabulators Limited, Increased Dividends.—An increase to 7½ per cent compared with 6 per cent for 1958-59 has been made in the final dividend of International Computers and Tabulators Limited. The total dividend amounts to 11¼ per cent. Group profits before tax have increased by nearly 27 per cent from £2,329,000 to £2,952,200.

Coventry Gauge & Tool Co., Ltd. Results.—The Coventry Gauge & Tool Co. Ltd. has declared a final divident of 6¾d., tax free per 10s. ordinary share making 9d. per share for the year ended August 31, 1960, against 7½d. net, per unit. A one-for-four rights issue is also proposed towards the end of January to provide additional working capital. After tax of £174,438 (£182,622) and depreciation of £84,356 (£75,861), the group net profit amounts to £219,721, against £181,250.

New Stock for Pullman Trains.—Early in the New Year, all the coaches composing two of the important Pullman trains serving the North Eastern Region of British Railways, i.e. "The Yorkshire Pullman" and "The Tees-Tyne Pullman" are to be replaced by entirely new stock. The new coaches for "The Yorkshire Pullman" will be on exhibition to specially invited guests on January 4, between 10 a.m. and 12 noon at Hull Paragon, Leeds Central, Bradford Exchange, and Harrogate. A similar exhibition of the new coaches for "The Tees-Tyne Pullman" has been arranged on January 11 at the same times at Darlington and Newcastle. The coaches embody striking new features and in many respects are a complete break from Pullman style. They will be brought into service on "The Yorkshire Pullman" on January 9 and on "The Tees-Tyne Pullman" on January 16.

Tools for the Export Trade.—To assist the smaller manufacturer who is also a potential exporter, Chamber of Commerce Publications has published a booklet entitled "Tools for the Export Trade." It is aimed at the manufacturer who has decided to try to sell his products in overseas markets, and it sets out the methods by which this may be done. It may be obtained from 68, Queen Street, London, E.C.4, 2s. 6d. post free.

Station to Close.—British Railways, Western Region, has announced the withdrawal of the passenger train service from Withington (Hereford) Station on and from January 2 next. The area is served by a road service from Hereford operated by the Birmingham & Midland Motor Omnibus Co. Ltd. Facilities will remain at the station for dealing with parcels handed in or collected by the public.

Dunlop Awards to Employees.—Awards totalling over £600 for the successful completion of study courses have been made to 77 Fort Dunlop employees of the Dunlop Rubber Company. Certificates have also been presented to 35 men on the successful completion of their five years' apprenticeship. Five of these have received prizes for exceptionally meritorious work in the apprentice school.

East Yorkshire Motor Services Limited, Recovery Continued.—A net profit of £76,280 for the year to September 30, 1960, by East Yorkshire Motor Services Limited, is £31,013 higher than the preceding year. It is proposed to increase by £10,000, to £30,000, the previous year's transfer to general reserve, to add 1 per cent free of tax to the dividend, and to increase the amount to be carried forward by £4,280. Gross revenue was £1,074,000 of which 17 per cent (£184,000) was paid to the Exchequer, including £90,400 to meet the special tax on road fuel.

West of India Portuguese Railway Co. Ltd. Lease Settlement.—Directors of the West of India Portuguese Guaranteed Railway Co. Ltd. have reached a settlement with the Portuguese Government in connection with the termination of the lease on March 31 next. Sir William Sharpe, Chairman, has stated that the effect on the accounts for the year to March 31, 1960, to be submitted shortly, will be divisible surplus profits of approximately £83,000, and it is expected those for the current year will exceed that figure. It has been specifically agreed that the terms cover all outstanding claims and neither will make any further claims against the other, apart from certain payments such as for services rendered, those arising from normal operations under contracts and any claims against the Southern Railway of India properly payable to the Government.

Pullman Service Deferred.—The new diesel Pullman train service which was to have run from St. Pancras to Leicester and Nottingham from January 2 has been postponed. This has been decided by the London Midland Region and the Pullman Car Company so that more time can be given to negotiations with the National Union of Railwaymen. The N.U.R.'s executive committee recently decided not to staff the new service. Experience has shown that it is uneconomic to run this train between London and Leicester only and, pending the outcome of negotiations, the Midland Pullman will—as

Paddington Station Christmas Decorations

The central feature of Christmas decorations at Paddington Station, British Railways, Western Region, a train announcer's office with fountain on its roof. Moving strip message reads: "The Western Region wishes everyone a very Happy Christmas"

from January 2, 1961—run between Manchester and London only in the following timings: Manchester Central, dep. 7.45 a.m.; Cheadle Heath, dep. 7.58 a.m.; London St. Pancras, arr. 11.00 a.m.; London St. Pancras, dep. 6.10 p.m.; Cheadle Heath, arr. 9.05 p.m.; Manchester Central, arr. 9.20 p.m.

Visitors' Spending.—Expenditure by overseas visitors in Great Britain and Northern Ireland was estimated to amount last year to £153 million. This sum contrasts with £129 million in 1957 and £138 million in 1958.

Men for Trial on Mail Theft Charge.—Four men accused of stealing postal packets from the Euston-Holyhead Irish Mail express on November 11, have been sent in custody for trial at the Central Criminal Court. They all pleaded Not Guilty and reserved their defence.

Sleeping Car Derailed.—The Duke and Duchess of Windsor were unhurt when the sleeping car of their Paris-bound train became derailed as it was being transferred from the ferry at Dunkirk recently. A switch failed and two cars left the rails. The Duke and Duchess finished their journey in another carriage.

New Depot for Oldham & Son Ltd.—The new Birmingham depot of Oldham & Son Ltd., opened recently by Mr. J. Oldham, chairman of the company, has a capacity one-third greater than its predecessor, and is to serve 12 counties in the Midlands and South Wales. A new system of palletised transport is being developed to handle goods passing through Birmingham.

New Passenger Ferry Launched.—The M.L. *Edith*, the second of three new vessels for the British Railways, Eastern Region, Tilbury-Gravesend passenger ferry, was launched at Whites Shipyard, Southampton, on December 19. Mrs. T. Tulloch, wife of the Shipping & Port Superintendent, performed the naming ceremony.

Head, Wrightson & Co. Ltd., Exhibition of Industrial Photographs.—An exhibition of over 40 large colour and monochrome photographs by Mr. John Jochimsen, artistically portraying interesting aspects of foundry, heavy-engineering, and scientific work by major divisions of Head Wrightson & Co. Ltd., took place at the London office of the company earlier this month.

Explosion in Glasgow Suburban Electric Train.—An explosion occurred in the guard's van of a Balloch to Glasgow electric train, British Railways, Scottish Region, on December 13, injuring the guard and seven passengers. The explosion occurred in thick fog near Renton. It damaged the guard's van and part of the adjoining coach. The driver was unaware of the explosion until someone pulled the emergency handle.

State of Bahia South Western Railway Company.—By consent, the Court of Appeal recently discharged an order of Mr. Justice Pennycuick sanctioning a scheme of arrangements between the State of Bahia South Western Railway Company and its secured creditors and shareholders, for dealing with funds arising from the sale of the company's railway system to the Brazilian Government. When the company's petition was before the Chancery Court last month, it was said that the total secured liabilities were about £791,000 and there was available for distribution about £614,500.

Express Bus Trips.—Express bus trips to the circus at Olympia and the Wembley ice show are being run by London Transport after Christmas from nearly 100 towns and villages outside London. Tickets will include admission to the show. The trips, which will continue until the end of January, will run on Saturday afternoons to the circus and on Wednesday evenings to the ice show. On the return journey, some of the buses will take people nearer to their homes in certain areas where local services by that time will have stopped running for the night.

A.B.C. Coupler & Engineering Co. Ltd.—The petition for compulsory winding-up of the A.B.C. Coupler & Engineering Co. Ltd., presented by F. H. Lloyd & Co. Ltd., has been dismissed.

Jones & Shipman Limited, Shares for Employees.—A personal gift of 5s. shares to more than 400 workers and retired workers is to be made by A. A. Jones & Shipman Limited. The number of shares each person will receive is to depend on the length of service over 10 years.

Stewarts and Lloyds Limited, Final Dividend.—The final dividend recommended for payment by Stewarts and Lloyds Limited is 12 per cent making a total of 15 per cent. Sales have increased by 18 per cent to £139,000,000 bringing a 70 per cent expansion in trading profits to £16,951,000.

Sixteen-year-old Boy Ordered to "Avoid Trains."—A boy aged 16 who admitted setting fire to two train compartments between Waterloo and Raynes Park, in the Southern Region of British Railways, was put on probation for three years at Wimbledon Juvenile Court last week and told to keep away from trains. He was also ordered to pay £37 10s. in part restitution to British Railways.

Open Forum at Middlesbrough.—The illustration on this page shows the most recent open forum meeting held by the North Eastern Region of British Railways at Middlesbrough. Over 450 people attended the meeting at the Town Hall crypt to see the film "Report on Modernisation," to hear an address by Mr. K. A. Kindon, Traffic Manager (Tees-side), and to hear questions from the floor answered by a panel consisting of Messrs. D. S. Lewis, District Commercial Superintendent; E. McClelland, District Operating Superintendent; and A. R. Jefferson, District Motive Power Superintendent. The Chairman was Mr. F. C. Margetts, Assistant General Manager (Traffic).

Revision of British Railways Postponed.—Plans for a revision of British Railways organisation have been postponed for a year, and the reforms will not be put into operation before 1962. This week an outline of the Government proposals was published in a White Paper.

Revised Date of Canadian Rail Strike.—Railway workers who originally set December 3 as the strike day against Canadian Railways, and had to postpone action because of the Bill providing for the continuation of the operation of the railways at least till next May 16, have now rescheduled strike action for May 16, 1961.

Hunslet (Holdings) Limited, Dividend.—The directors of Hunslet (Holdings) Limited have recommended a dividend on the ordinary shares of 7½ per cent for the year to July 31, 1960, payable on January 30, 1961. The debenture interest of £3 5s. per £100 of stock will be paid on February 1. The annual general meeting of the Company will take place on January 30.

Turton & Edgworth and Golborne Stations to Close.—Turton & Edgworth and Golborne Stations, British Railways, London Midland Region, will be closed on and from February 6. Turton & Edgworth, between Bolton and Blackburn, will be closed for passenger and parcel traffic, which will henceforth be dealt with at Bromley Cross station, and converted into an unstaffed goods depot. Freight traffic in less than truck loads and full truck loads requiring B.T.C. cartage will be handled at Bolton (Manchester Road). All other traffic will still be dealt with at Turton & Edgworth. The area is served by buses of Ribble Motor Services Limited. Golborne station, between Warrington and Wigan, will be closed for passenger traffic. Bookings should be made to Wigan or Warrington according to direction of travel. The area is served by buses of Lancashire United Transport Limited.

Open forum at Middlesbrough, showing Mr. Kindon making his speech

Architecture in Transport.—On January 25 at 6 p.m., Mr. E. F. C. Curtis, Architect to the British Transport Commission, will deliver the Alfred Bossom Lecture, entitled "Architecture in Transport," at the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2. The Right Hon. Lord Bossom will preside at the meeting.

Two Railwaymen Killed on Line.—Two railwaymen were killed and two others injured when a train ran into a gang working on the main London-Kent Coast line, British Railways, Southern Region, on December 18. Three ambulances were called.

A.C.V. Limited Results.—The group profit of Associated Commercial Vehicles Limited for the year ended September 30, 1960, amounts to £1,512,935 (£966,115). The net profit after all charges, including taxation, amounts to £783,357 (£538,238). A final dividend of 15 per cent is proposed which with the interim of 7½ per cent, will make a total of 22½ per cent for the year.

Railway Stock Market

Apart from a further rise in shipping shares, stock markets have continued to display a good deal of uncertainty, though buyers were more in evidence. The general assumption is that the new year is likely to open with a more optimistic feeling in markets, but much may depend on the trend of Wall Street which is awaiting further indications of Mr. Kennedy's plans for stimulating the U.S. economy.

Very little business has been passing in foreign rails. Antofagasta ordinary stock, which recently came into the limelight because of the resumption of dividends, eased further to 16½; highest and lowest levels of this stock in 1960 were 18 and 12. The preference stock now 33½, has had extremes in the year of 36 and 27½. Costa Rica Railway ordinary stock has held steady at 33½, which compares with the year's extremes of 44 and 21; the first and second debentures at 96 and 112½ respectively were maintained at the same levels as a week ago. Chilean Northern 5 per cent first debentures were 53½; extremes in 1960 were 60 and 52½.

Guayaquil & Quito assented bonds have been changing hands around 55, the year's lowest; the year's peak was 82. Paraguay Central prior debentures continued their improvement and were 15½; the year's high and low were 17⅜ and 12 respectively. Brazil Railway bonds eased to 4⅜; the year's extremes were 8½ and 4½. International Railways of Central America common shares are now at the year's low of $18; their best in 1960 was $26. The preferred stock of the last-named company was $105½, comparing with extremes in the year of $114½ and $100½.

United of Havana second income stock at 6 was the same as a week ago; the year's extremes were 6¼ and 5. San Paulo Railway 3s. units were again quoted at 1s. comparing with a high and low of 1s. 7d. and 9d. in the year.

Canadian Pacifics, currently quoted at $17⅛, have been up to $24¾ and down to $14⅛ this year. The preference stock, currently 61½, have had extremes this year of 62½ and 55. Those for the 4 per cent debentures were 66⅞ and 60, and the current price 61⅜. White Pass, now $9⅞ are at the lowest for the year; the year's peak was $14. Extreme prices in 1960 for West of India Portuguese stock were 113 and 108; the current price is 110½. Midland Railway of Western Australia ordinary stock, now 6½, fluctuated in 1960 between 7½ and 4½.

Nyasaland Railways shares are now 9s.—the year's lowest; their best in 1960 was 10s. 9d.

Shares of locomotive builders and engineers have been inclined to strengthen in the past week, but in common with some industrial shares they are not far short of their lowest levels touched in 1960. Charles Roberts 5s. shares, for example, are currently 8s. 3d. compared with the year's extremes of 20s. 3d. and 7s. 10½d. Extremes for Beyer Peacock were 9s. 1½d. and 5s. 6d. and the current price 6s. 3d. Gloucester Wagon 10s. shares, now 9s. 9d. have had extremes of 17s. 9d. and 9s. 3d. Wagon Repairs 5s. shares have been down to 10s. 9d. this year and up to 20s. 6d., while the current price is 17s. 6d. G. D. Peters (extremes 22s. 6d. and 13s. 6d.) are now 15s. 7½d. Highest of the year for Birmingham Wagon was 43s. 6d. and the current price of 26s. 6d. North British Locomotive at 6s. 3d. are at their lowest point for the year; their peak was 13s. 6d. Westinghouse Brake (extremes 59s. 9d. and 37s. 9d.) are now 39s. 3d.

Electricals are not far short of the year's lowest prices. A.E.I. for example, have had extremes in 1960 of 66s. 6d. and 39s. 3d. and are currently 40s. Current prices and the year's high and low levels of some other leading shares are as follows. English Electric 32s. 9d. (53s. and 30s. 9d.). G.E.C. 29s. 6d. (47s. 6d. and 29s. 3d.). Pressed Steel 5s. shares 26s. 3d. (40s. 9d. and 26s. 3d.). Dowty Group 10s. shares 34s. (41s. 6d. and 29s. 9d.). An illustration of the big fluctuations in stock markets this year is provided by Imperial Chemicals which are now 66s. 4½d.—well below the year's best, despite continued expectations in the City of a higher dividend of at least 12½ per cent; these shares have had extremes in 1960 of 75s. 3d. and 54s. 3d.

Forthcoming Meetings

January 2 (*Mon.*). — The Institute of Transport, Metropolitan Section, at 80, Portland Place, London, W.1, at 5.30 p.m. "The Work and Problems of the British Transport Police," Mr. L. James.

January 2 (*Mon.*). — The Institute of Transport, East Anglia Section, Norwich, at 6 p.m. "The Role of the Minibus in Transport," Mr. J. Madgett.

January 3 (*Tue.*). — The Institute of Transport, Portsmouth Section, at Solent Hotel, Southsea, at 7 p.m. "Railway Traffic Control Arrangements at Portsmouth," Mr. I. F. Gilmore.

January 4 (*Wed.*)—Society of Chemical Industry, Corrosion Group, at 14 Belgrave Square, London, S.W.1, at 6 p.m. Discussion of Galvanic Anodes.

January 4 (*Wed.*). — The Institute of Transport, South Western Section, at Great Western Hotel, Exeter, at 12.30 p.m. Debate.

January 4 (*Wed.*).—The Newcomen Society, at Kensington Science Museum, at 5.30 p.m. "Joshua Gilpin, an American Manufacturer in England and Wales: Pt. II, 1811-14," Dr. H. B. Hancock and Dr. N. B. Wilkinson.

January 4 (*Wed.*).—British Railways (Southern Region), Lecture & Debating Society, at the Chapter House, London, at 6 p.m. "Personal Reminiscences of Dugald Drummond and his Locomotives," Mr. T. Clyde Britten.

January 5 (*Thu.*).—British Railways (Western Region), London Lecture & Debating Society, at Headquarters Staff Dining Club, Bishops Bridge Road, Paddington, London, at 5.45 p.m. "Design & Transport," illustrated talk, Mr. T. H. Summerson.

January 6 (*Fri.*). — The Institute of Transport, Western Section, at the Bristol Docks Office, at 1.15 p.m. Papers by graduates and students.

January 7 (*Sat.*).—Railway & Canal Historical Society, North Western Group. Meeting, at Oddfellows' Institute, Stockport, at 6.30 p.m. "Architecture of the Canals," Dr. C. T. G. Boucher.

January 9 (*Mon.*). — The Institute of Transport, London Section at 66, Portland Place, London, W.1, at 5.45 p.m. Paper.

January 9 (*Mon.*). — The Institution of Mechanical Engineers, at 1, Birdcage Walk, London, S.W.1, at 6 p.m. Internal Combustion Engine Group Discussion.

January 10 (*Tue.*). — British Railways (Western Region) Lecture & Debating Society, joint debate with South Wales & Monmouthshire Railways & Docks Lecture & Debating Society, at Cardiff. "That the B.T.C. does not offer a sufficiently attractive Career to Interest Modern Youth."

January 10 (*Tue.*). — British Railways Bristol Lecture & Debating Society, at Staff Association Building, Temple Meads Station, at 6 p.m. "The M.1 Motorway," Mr. Holliday.

January 10 (*Tue.*). — The Institution of Civil Engineers, at Great George Street, London, S.W.1, at 5.30 p.m. "The Loading of Light Railway Tracks," Mr. J. M. Kesson.

January 11 (*Wed.*). — The Permanent Way Institution, London Section, at British Transport Commission, Marylebone Road, London, N.W.1, at 6.30 p.m. Quiz.

January 11 (*Wed.*). — Institution of Railway Signal Engineers, London Section, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, at 6 p.m. "Automatic Marshalling Yards," Mr. J. C. Kubale.

OFFICIAL NOTICES

FOR SALE

RAILWAY CARRIAGE AND WAGON TRAVERSER: 40 ton pit type, electric, 45 ft. long (could be extended by purchasers if desired), 3 ft. 6 in. gauge. Speed—Travelling 150 ft., Hauling 75 ft. per minute. Electrical equipment 400 v., 3 phase, 50 cycles. Motor 25 b.h.p. Makers: Ransomes & Rapier Ltd. Available at Takoradi, Ghana. Unused and in excellent condition. Price and further particulars from The Crown Agents, 4, Millbank, S.W.1. (Ref. O/Prod. 1791.)

NEW ZEALAND GOVERNMENT RAILWAYS DEPARTMENT

IT IS proposed to purchase 6 sets of diesel engines and hydraulic torque converters for diesel hydraulic locomotives: 260 h.p. 3 ft. 6 in. gauge. Tenders are due to close in New Zealand on 8 February, 1961. Manufacturers of this equipment are invited to apply to:—

Chief Purchasing Officer,
New Zealand Government Offices,
Purchasing Branch (C/F.99/3199),
Adelphi Building,
John Adam Street,
London, W.C.2
for tender documents.

Foreign Employment

ROADMASTER

ENGINEERING GRADUATE preferred; minimum of two years engineering training essential.

Require two years varied railroad engineering service, or five years in direct charge of track crews. Will supervise 135 men maintaining 45-mile railroad assign work, order materials, be responsible for safety, make regular detailed inspections of roadbed and all track on main line, sidings and yards, bridges, tunnels, etc. Will make engineering calculations relating to maintenance and use of structure and equipment. Must speak Spanish. Married or single candidates acceptable.

Excellent opportunity large copper company, Chile, South America. Two year contract with transportation both ways for you and family. Basic salary $525.00 to $650.00 per month depending upon age and experience of applicant.

Box 6, *The Railway Gazette*, 33 Tothill Street, S.W.1.